DUPLICATE AVAILABLE FOR LOAN

National Meteorological
Library & Archive
London Road
Bracknell RG12 2SZ

UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

September 2002

Data Assimilation
Meteorological Office
London Rd
Bracknell
Berkshire
RG12 2SZ

This report has not been published. Permission to quote from it should be obtained from the Head of Data Assimilation

ORGS UKMO U

National Meteorological Library
FitzRoy Road, Exeter, Devon. EX1 3PB

Distribution List

Mr B Sumner	NMC, Victoria, Australia
Dr S. C. Chou	CPTEC/INPE, Brazil
Dr V Wagner	Deutscher Wetterdienst, Hamburg, Germany
Ms C Nelson	NMC, Washington, USA
Mr H Benichou	SCEM METEO-FRANCE.
Mr E A Meindl	National Data Buoy Centre, Stennis Space Center, USA
Mr G Verner	Canadian Meteorological Centre, Quebec, Canada
Permanent Rep. with WMO	Moscow, Russia
Hydrometcentre of the Russian Federation	Moscow, Russia
Mr Yukinari Ohta	JMA, Tokyo, Japan
Mr Francois Lalaurette	Head, Meteorological Operations Section, ECMWF, Reading, UK
Dr M J Uddstrom	Met. Service, Wellington, New Zealand
Mrs M Holmes	Met. Office, Bracknell, UK
Mr R W Lunnon	Met. Office, Bracknell, UK
Dr B Macpherson	Met. Office, Bracknell, UK
Mr B Oatway	Met. Office, Bracknell, UK
Mr C A Parrett	Met. Office, Bracknell, UK
National Meteorological Library	Met. Office, Bracknell, UK

CONTENTS

1. Introduction

2. Global Data Monitoring Statistics

3. Composite Observing Systems for the North Atlantic (COSNA)

...oooOOOooo...

1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Dr. B. Macpherson
Mesoscale Data Assimilation and Observational Monitoring
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias|	$\geq$ 4 hPa	(pressure),
	$\geq$ 5 $m\ s^{-1}$	(wind speed),
	$\geq$ 30 degrees	(direction).
	$\geq$ 3 degrees	(sea surface temperature).
2.SD	$\geq$ 6 hPa	(pressure),
	$\geq$ 80 degrees	(direction).
	$\geq$ 5 degrees	(sea surface temperature).
3.PGE	$\geq$ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
BBXX KS0	P	528	1	100	4.7	5.1	6.9
CG2556	P	27	0	4	2.0	-9.3	9.5
CG2992	P	483	56	100	4.0	-8.8	9.6
C6LF8	P	37	0	24	1.2	4.3	4.4
ELZW3	P	21	0	90	0.9	5.7	5.7
KS000	P	152	0	3	1.1	9.8	9.8
KS010	P	30	0	0	0.4	4.4	4.4
KS025	P	181	0	100	0.9	8.6	8.7
LAOL5	P	21	0	62	1.6	4.8	5.0
MVLA7	P	36	0	11	1.8	4.0	4.4
OUSE6	P	23	4	4	0.5	-5.1	5.1
OWDD	P	72	0	1	1.3	-4.5	4.7
P3NK5	P	33	6	73	3.5	6.0	6.9
P3YS5	P	57	0	0	0.8	4.4	4.4
UFAA	P	44	0	0	1.2	8.1	8.2
VCQM	P	38	3	63	0.8	5.2	5.2
WE6970	P	29	0	83	1.7	11.0	11.2
0209	P	21	0	48	2.3	-4.2	4.8
48092	P	149	26	85	8.7	2.6	9.1
63108	P	125	0	74	3.3	5.0	6.0
9HER7	P	20	0	95	1.3	8.7	8.8
WIND SPEED							
C6FM7	SPEED	31	3	100	3.9	5.1	6.4
ELRR4	SPEED	66	0	100	2.3	5.8	6.2
KHRF	SPEED	51	2	24	4.4	8.8	9.9
KS010	SPEED	30	0	100	1.6	-5.0	5.2
KS025	SPEED	56	0	4	2.3	-6.2	6.6
OUSE6	SPEED	23	0	100	5.1	10.1	11.3
OWVI2	SPEED	56	2	21	5.8	5.5	8.0
V2EU	SPEED	27	7	96	5.3	14.0	15.0
ZCBH9	SPEED	37	0	100	5.5	8.1	9.8
WIND DIRECTION							
GHKF	DIRN.	37	0	0	20.0	41.4	46.0
P3EK7	DIRN.	27	0	0	49.7	32.2	59.2
VCLM	DIRN.	88	0	0	105.2	12.7	105.9
23095	DIRN.	25	0	0	32.0	-34.5	47.0
SEA SURFACE TEMPERATURE							
BBXX KS0	SST	413	39	100	2.6	-1.3	2.9
CGDX	SST	141	67	100	1.7	2.7	3.2
CGHL	SST	37	38	38	0.9	0.1	0.9
CGTF	SST	85	48	100	2.6	3.0	4.0
CG2350	SST	215	28	100	0.9	0.1	0.9
CG2522	SST	521	98	100	2.9	6.9	7.5
CG2992	SST	424	98	100	0.1	9.8	9.8
CG8048	SST	64	100	100			
C6MS4	SST	39	0	100	0.8	-4.1	4.2
C6QO9	SST	38	11	100	1.7	3.6	4.0
FNCM	SST	156	62	62	1.2	0.1	1.2
FNJI	SST	111	0	100	1.2	3.2	3.4
GNLB	SST	25	28	28	0.5	0.4	0.7
H9IM	SST	23	0	100	0.8	4.0	4.1
KCB53	SST	21	0	29	1.3	3.1	3.4
KRPB	SST	66	0	100	0.7	-6.2	6.3
KS000	SST	133	40	100	1.5	-0.7	1.7
KS007	SST	58	100	100			
KS011	SST	141	0	46	1.7	-3.5	3.8
KS014	SST	33	58	100	2.7	4.1	4.9

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURE							
KS025	SST	161	51	79	1.2	-0.1	1.2
LF5T	SST	93	29	100	0.3	0.7	0.7
P3NK5	SST	30	20	100	1.2	-7.4	7.5
TSLN	SST	140	0	100	1.1	-4.5	4.6
TSMS	SST	103	0	37	0.8	-3.7	3.8
UCBM	SST	34	6	100	2.7	-4.7	5.4
UCBP	SST	21	0	100	3.1	-5.8	6.5
UCDM	SST	29	0	62	1.9	-5.0	5.3
UCJL	SST	33	3	48	1.7	3.0	3.5
UCOZ	SST	21	0	71	2.3	-3.5	4.2
VCLM	SST	405	67	100	1.3	-0.4	1.4
VGLZ	SST	30	100	100			
VGNW	SST	28	25	100	1.3	-0.4	1.4
VJNV	SST	24	4	50	1.2	4.0	4.2
VJRB	SST	20	0	100	0.5	-3.3	3.4
VOCJ	SST	211	0	100	2.0	3.1	3.7
V7CZ2	SST	21	0	38	2.8	3.1	4.2
WCW9126	SST	33	94	100	0.3	1.1	1.1
WDHL	SST	33	79	82	1.7	-0.4	1.7
WUW2120	SST	28	39	39	1.5	-0.7	1.7
WWU8	SST	27	100	100			
XYYY	SST	22	18	77	2.2	4.9	5.4
23094	SST	55	0	100	1.8	-4.3	4.7
3FMM6	SST	46	0	100	0.5	-3.7	3.8
45140	SST	624	100	100			
45141	SST	609	84	100	0.1	9.6	9.6
45147	SST	497	100	100			
45148	SST	548	100	100			
45152	SST	621	100	100			
46131	SST	623	100	100			
46146	SST	623	100	100			
46181	SST	623	100	100			

Figure 1. SHIP/SYNOP mean daily count. SEPTEMBER 2002
Main hours only
Global average number of observations in 24 hours = 21231

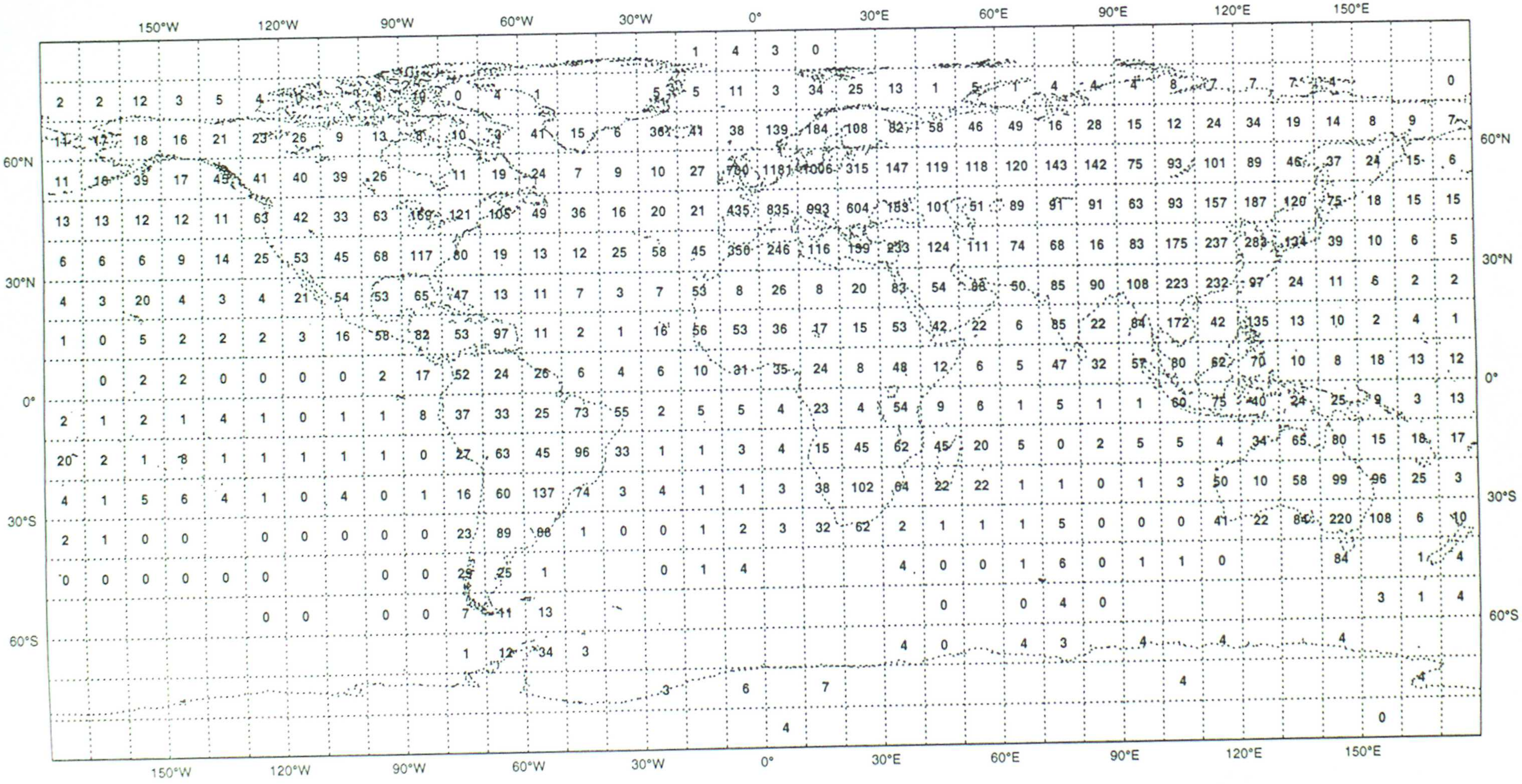

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for drifting buoys.
Standard of comparison	:Background field from UKMO global model.
Position	:Average latitude and longitude for period.
Observation times	:00, 06, 12, 18 UTC
Elements monitored	:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees). :Sea surface temperature (degrees).

Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	: Percentage of observations flagged excluding those with gross errors
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT	:15 hPa	(pressure)
	:25 m s^{-1}	(vector wind)
	:10 degrees	(sea surface temperature)

SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 m s^{-1}	(wind speed),
		≥ 30 degrees	(direction).
		≥ 3 degrees	(sea surface temperature).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
		≥ 5 degrees	(sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
16943	-45.3	52.6	P	453	1	100	3.5	4.9	6.0
21534	43.5	137.8	P	379	100	100			
23562	6.0	85.9	P	282	100	100			
23638	5.8	97.4	P	510	29	50	2.1	2.6	3.4
25571	85.4	164.0	P	231	16	100	7.6	0.6	7.6
46636	50.0	-170.0	P	23	74	74	0.1	0.8	0.9
48574	76.8	-125.8	P	724	35	72	4.3	-0.1	4.3
48590	83.1	-86.5	P	378	47	93	4.5	-7.7	9.0
61664	41.9	28.0	P	78	0	100	0.5	-6.3	6.3
71543	-60.1	-33.6	P	68	40	51	3.4	2.1	4.0
WIND SPEED									
23924	12.0	87.1	SPEED	229	14	100	2.0	14.1	14.2
42851	22.0	-97.6	SPEED	65	0	100	5.5	5.7	7.9
WIND DIRECTION									
21535	26.0	152.9	DIRN.	270	0	0	13.0	-40.9	42.9
23924	12.0	87.1	DIRN.	200	16	0	20.6	84.6	87.0
41536	21.6	-68.5	DIRN.	222	3	0	36.0	49.2	61.0
41648	24.5	-70.9	DIRN.	199	2	0	20.3	63.4	66.6
41667	26.7	-75.4	DIRN.	121	10	0	18.1	35.2	39.5
SEA SURFACE TEMPERATURE									
14550	-7.9	64.9	SST	43	0	100	0.0	-9.6	9.6
23591	6.3	73.3	SST	45	100	100			
23638	6.5	97.2	SST	88	7	69	2.9	-3.6	4.7
23650	7.1	72.7	SST	44	59	75	3.8	-1.9	4.3
23949	5.9	80.6	SST	76	100	100			
32526	2.9	-100.0	SST	181	100	100			
32907	7.8	-78.8	SST	188	45	49	0.5	0.0	0.5
33560	-17.0	76.8	SST	20	100	100			
41563	21.3	-54.0	SST	116	0	100	0.0	7.9	7.9
44504	50.0	-42.3	SST	423	87	100	0.4	9.3	9.4
44607	39.5	-43.1	SST	215	0	100	0.6	8.7	8.8
44772	58.1	-36.5	SST	593	57	100	0.3	9.5	9.5
46636	50.0	-170.0	SST	23	74	78	1.8	0.5	1.9
46972	18.1	-131.5	SST	191	0	100	0.3	3.8	3.8
51741	4.4	-139.5	SST	82	30	100	0.5	9.0	9.0
51742	1.0	-140.9	SST	79	0	100	0.5	8.3	8.3
51866	-2.7	-151.2	SST	75	37	97	2.2	-6.3	6.6
52803	-1.2	152.5	SST	34	82	82	0.0	-0.2	0.2
55905	-54.0	-121.7	SST	425	0	82	0.9	3.0	3.1
61536	34.0	35.6	SST	34	0	100	0.5	4.4	4.4
74520	-57.9	-17.2	SST	224	39	99	1.9	8.3	8.5

Figure 2. DRIFTER mean daily count. SEPTEMBER 2002
Main hours only
Global average number of observations in 24 hours = 8838

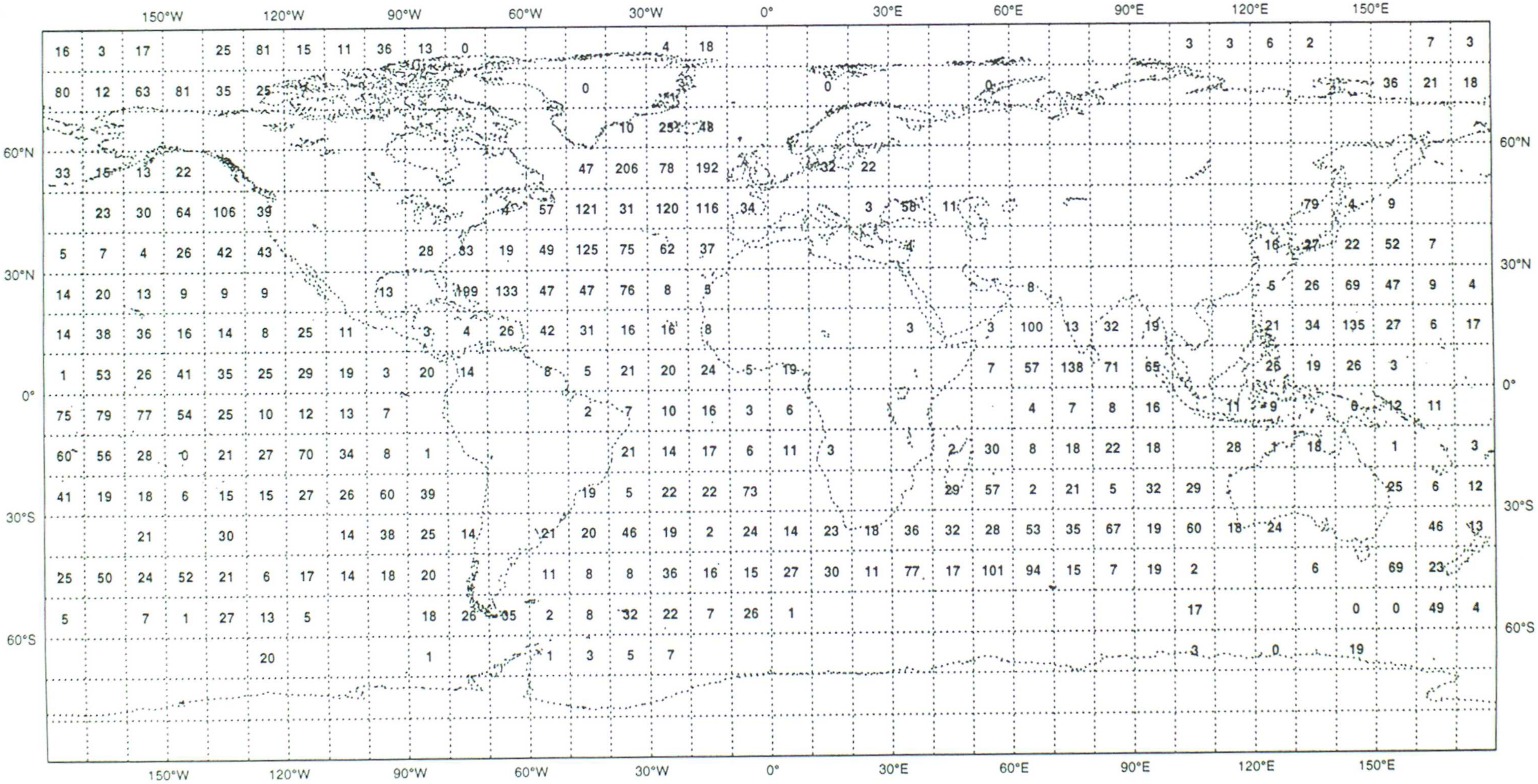

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
16 3 17 25 81 15 11 36 13 0 4 18 3 3 6 2 7 3
80 12 63 81 35 25 0 0 0 36 21 18
10 25 48
33 15 13 22 47 206 78 192 32 22
23 30 64 106 39 4 57 121 31 120 116 34 3 58 11 79 4 9
5 7 4 26 42 43 28 83 19 49 125 75 62 37 4 16 27 22 52 7
14 20 13 9 9 9 13 199 133 47 47 76 8 5 8 5 26 69 47 9 4
14 38 36 16 14 8 25 11 3 4 26 42 31 16 16 8 3 3 100 13 32 19 21 34 135 27 6 17
1 53 26 41 35 25 29 19 3 20 14 8 5 21 20 24 5 19 7 57 138 71 65 26 19 26 3
75 79 77 54 25 10 12 13 7 2 7 10 16 3 6 4 7 8 16 11 9 8 12 11
60 56 28 0 21 27 70 34 8 1 21 14 17 6 11 3 2 30 8 18 22 18 28 1 18 1 3
41 19 18 6 15 15 27 26 60 39 19 5 22 22 73 29 57 2 21 5 32 29 25 6 12
21 30 14 38 25 14 21 20 46 19 2 24 14 23 18 36 32 28 53 35 67 19 60 18 24 46 13
25 50 24 52 21 6 17 14 18 20 11 8 8 36 16 15 27 30 11 77 17 101 94 15 7 19 2 6 69 23
5 7 1 27 13 5 18 26 35 2 8 32 22 7 26 1 17 0 0 49 4
20 1 1 3 5 7 3 0 19
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for synops & autosynops.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Surface pressure (hPa).

Parameters monitored

:HT(m) :Station height (in metres) as given in WMO No. 9 Vol A

:RP :Pressure reporting practice
M=mean sea level pressure (hPa) reported.
S=Station level pressure reported.
8=Geopotential height (m) of 850 hPa surface reported.
7=Geopotential height (m) of 700 hPa surface reported.

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1.|bias| ≥ 4 hPa
2. SD ≥ 6 hPa
3.PGE ≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60437	36.3N	2.8E	981	S8	84	0	0	0	0.8	-6.6	6.6
60728	36.4N	10.7E	1	MS	61	0	0	0	0.6	-8.2	8.2
61492	16.1N	13.5W	18	MS	44	0	0	7	2.7	4.5	5.2
63330	13.5N	39.5E	2070	MS	35	35	100	0			
63333	11.1N	39.7E	1903	MS	36	0	0	3	1.1	6.1	6.2
63334	10.3N	37.7E	2515	MS	36	1	3	3	0.8	11.2	11.2
63402	7.7N	36.8E	1725	MS	35	3	9	3	0.7	8.6	8.6
63450	9.0N	38.8E	2354	MS	25	0	0	0	0.7	4.9	4.9
63453	8.9N	39.9E	930	S	34	0	0	3	1.4	-4.7	4.9
63471	9.6N	41.9E	1260	MS	34	0	0	0	1.0	9.8	9.9
63478	5.9N	43.6E	295	MS	27	0	0	0	0.6	5.1	5.1
63680	0.3N	32.6E	1144	S	34	0	0	0	0.8	-6.7	6.7
63801	4.9S	29.6E	882	S8	96	2	2	1	0.7	8.4	8.4
65355	9.8N	1.1E	342	MS	85	0	0	0	1.0	-12.8	12.8
67308	22.1S	31.7E	452	M	38	38	100	0			
68014	19.6S	18.1E	1411	S8	74	0	0	15	0.7	-4.2	4.3
68030	18.5S	25.6E	1071	8	75	0	0	1	0.9	4.8	4.9
68338	26.9S	24.6E	1234	S8	62	61	98	0	0.0	8.1	8.1
68396	26.5S	31.3E	641	S8	58	0	0	0	0.8	4.5	4.6
68558	30.9S	27.6E	1816	S8	65	65	100	0			
68575	30.0S	30.0E	1175	S8	111	111	100	0			
68754	32.5S	27.5E	899	S8	84	84	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
23975	60.4N	88.4E	86	7	116	116	100	0			
30554	54.5N	113.6E	995	MS	120	0	0	0	5.3	5.5	7.6
30967	49.9N	115.8E	623	MS	89	0	0	0	1.4	-5.7	5.9
36982	41.9N	78.2E	3635	S7	117	1	1	1	0.7	6.0	6.0
40713	37.4N	46.3E	1475	MS	89	0	0	0	0.6	12.5	12.5
40741	36.6N	61.2E	235	MS	87	0	0	1	0.7	-4.6	4.7
40757	35.6N	53.4E	1171	MS	84	0	0	0	0.6	4.2	4.2
41254	23.1N	57.7E	1755	S8	64	64	100	0			
43415	8.8N	80.5E	98	S	59	59	100	0			
44304	47.3N	110.6E	1035	MS	120	1	1	73	1.3	-4.7	4.9
44416	28.6N	81.6E	720	MS	72	5	7	1	1.1	4.5	4.6
47022	40.8N	128.2E	1200	S	91	0	0	1	1.4	4.5	4.7
47127	36.9N	127.0E	16	MS	120	0	0	0	0.8	-11.2	11.2
48925	20.7N	102.0E	550	M	28	11	39	0	0.8	-13.6	13.6
48935	19.5N	103.1E	1050	8	28	0	0	4	0.8	-8.4	8.4
51495	43.2N	91.7E	874	M	117	0	0	0	1.1	7.1	7.2
52602	38.8N	93.4E	2734	S	120	0	0	0	1.0	-6.1	6.2
52866	36.6N	101.8E	2262	S	120	0	0	0	0.9	-4.0	4.1
52955	35.6N	100.8E	3201	S	120	0	0	0	1.0	12.0	12.0
56146	31.6N	100.0E	339	S	120	120	100	0			
56462	29.0N	101.5E	2994	S	119	0	0	0	1.3	8.4	8.5
57816	26.6N	106.7E	1074	MS	119	93	78	54	0.2	-14.7	14.7

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	41	0	0	0	1.4	-6.6	6.7
80315	3.0N	75.3W	439	MS	78	0	0	26	1.1	-4.1	4.2
82181	2.0S	54.1W	146	MS	84	0	0	0	1.1	5.9	6.0
83235	12.4S	46.4W	604	MS	88	0	0	2	1.4	6.8	6.9
83332	14.1S	46.4W	826	MS	85	40	47	0	1.1	14.2	14.2

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
83531	18.6S	46.5W	940	MS	87	0	0	0	0.8	-6.6	6.6
83836	25.5S	50.6W	837	MS	87	0	0	0	0.8	-5.4	5.5
84377	3.8S	73.3W	125	MS	110	0	0	0	1.1	5.3	5.4
84401	5.2S	80.6W	49	MS	109	0	0	0	0.9	4.4	4.5
84425	5.9S	76.1W	179	MS	79	0	0	0	1.0	4.9	5.0
84455	6.5S	76.4W	281	MS	78	0	0	0	1.1	7.9	8.0
84472	7.1S	78.5W	2620	S	53	0	0	0	0.8	-5.6	5.7
84474	7.2S	76.7W	350	S	22	0	0	0	1.1	9.6	9.7
84686	13.6S	72.0W	3248	S	109	0	0	0	1.0	-5.3	5.4
84688	13.7S	73.4W	3444	S	48	0	0	0	0.5	-13.1	13.1
84720	14.9S	75.0W	567	MS	50	0	0	0	0.7	5.5	5.5
84782	18.1S	70.3W	468	MS	83	0	0	0	1.4	7.0	7.1
85264	18.5S	64.1W	1998	S	55	55	100	0			
85312	19.8S	63.9W	992	S	44	4	9	9	1.2	-12.8	12.9
85406	18.3S	70.3W	55	M	117	0	0	0	0.8	4.3	4.4
85432	22.5S	68.9W	2320	S8	81	0	0	0	0.8	5.2	5.3
87904	60.3S	72.1W	199	MS	25	12	48	68	6.8	-3.7	7.7

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71049	66.0N	91.8W	150	MS	119	70	59	54	1.7	13.2	13.3
71811	50.2N	66.3W	55	M	73	14	19	71	6.6	9.0	11.2
72327	36.1N	86.7W	182	MS	120	0	0	0	0.6	4.6	4.6
72375	34.6N	111.2W	2291	MS	119	110	92	54	0.3	14.4	14.4
72376	35.2N	111.8W	2192	M	120	0	0	0	1.6	4.4	4.7
76118	30.4N	109.7W	1040	MS	22	0	0	0	0.6	-10.8	10.8
76243	28.7N	100.5W	250	MS	100	1	1	2	1.2	5.7	5.8
76543	22.0N	98.8W	104	MS	37	0	0	3	0.8	6.1	6.2
76625	20.6N	100.4W	1813	MS	43	0	0	0	0.7	-9.8	9.8
76658	19.2N	103.7W	494	MS	32	0	0	0	1.0	5.7	5.8
76683	19.3N	98.2W	2248	MS	80	0	0	0	0.6	4.1	4.1
76743	18.0N	92.9W	10	MS	65	0	0	0	0.9	5.9	6.0
76762	17.5N	99.5W	1265	MS	91	1	1	0	0.8	5.4	5.5
76773	17.8N	97.8W	1650	MS	20	1	5	0	0.5	4.3	4.3
76840	16.2N	93.9W	64	MS	34	1	3	6	1.6	4.5	4.8
76845	16.7N	92.6W	2116	MS	73	0	0	3	0.9	4.0	4.1
76903	14.9N	92.3W	118	MS	98	0	0	0	0.7	6.6	6.6

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	42	0	0	0	0.8	8.5	8.5
94130	14.8S	131.9E	120	MS	118	0	0	0	1.1	5.2	5.3
94322	20.2S	130.0E	340	MS	116	116	100	0			
94368	20.3S	149.0E	2	MS	117	0	0	0	0.7	-4.8	4.9
95541	29.8S	151.1E	582	MS	90	0	0	92	1.1	-4.9	5.0
95815	35.1S	144.0E	72	MS	119	0	0	0	3.1	4.6	5.5
96505	3.7N	115.7E	905	S8	24	23	96	0	0.0	-0.3	0.3
97378	10.7S	123.1E	1	S8	50	49	98	0	0.0	-12.3	12.3

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
06685	47.0N	9.1E	515	MS	120	0	0	0	0.9	6.8	6.9
12140	54.4N	18.7E	2	MS	120	0	0	0	0.5	8.0	8.0
13269	44.3N	19.9E	176	MS	112	0	0	0	0.6	7.6	7.6
14554	44.9N	18.4E	140	S	49	2	4	0	0.9	-13.5	13.5
15140	46.5N	22.4E	500	S8	23	22	96	0	0.0	1.9	1.9

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
15284	45.6N	26.4E	1632	S8	32	0	0	19	1.9	4.8	5.2
17092	39.8N	39.5E	1218	S8	120	0	0	0	0.9	6.3	6.4
17203	38.9N	40.5E	1177	S8	120	0	0	0	0.7	4.3	4.4

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	104	0	0	0	1.8	-8.0	8.2
89208	90.0S	0.0W	2835	M	34	29	85	0	0.6	-1.7	1.8
89253	63.2S	55.4W	75	M	196	1	1	0	2.1	4.0	4.5
89263	66.0S	66.1W	20	M	237	8	3	5	4.3	8.2	9.3
89264	71.4S	68.9W	780	S	245	0	0	0	1.4	7.9	8.0
89266	72.2S	60.3W	91	S	251	203	81	0	2.7	-13.6	13.9
89272	74.8S	71.5W	1369	S	143	143	100	0			
89512	70.8S	11.8E	140	MS	120	0	0	0	1.7	-4.9	5.2
89637	69.9S	130.0E	2560	S	85	32	38	0	2.3	11.6	11.8
89744	74.0S	43.0E	3353	S	264	0	0	0	0.6	7.8	7.8
89769	78.5S	168.4E	50	S	376	376	100	0			

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	2621	1	38	1.2	0.4	2600	0	38	0	5.5	0.6
AAL	6883	1	32	1.7	0.3	6637	0	31	0	6.3	0.5
AAR	1731	0	6	1.6	-0.2	1701	0	7	0	7.3	0.4
ACA	3833	0	5	1.6	-0.2	3478	0	7	0	7.7	0.2
AEA	938	0	3	1.5	0.7	515	0	4	0	6.4	0.9
AEL	618	0	8	1.5	-0.8	483	0	8	0	6.5	0.6
AFL	579	1	4	1.7	0.6	520	0	5	0	8.1	0.2
AFR	1718	1	6	1.5	0.3	1346	0	7	0	7.1	0.8
AIS	231	3	10	1.6	-0.5	209	0	11	0	8.4	0.5
AJM	493	0	3	1.2	-0.1	428	0	3	0	6.9	0.9
AJX	215	0	6	1.7	0.9	212	0	6	0	7.6	0.4
AMM	128	1	9	1.8	0.5	98	0	10	0	7.7	0.1
AMT	1376	0	42	1.0	0.1	1370	0	43	0	5.7	0.4
AMX	331	1	5	1.3	0.2	249	0	6	0	8.1	0.2
ANA	364	1	7	1.6	0.6	362	0	8	0	7.4	0.2
ANZ	4145	0	30	1.4	0.0	4122	0	30	0	6.5	0.9
ARG	33	0	18	3.0	0.6	22	0	18	0	13.2	3.0
AUA	37	0	3	1.1	0.0	36	0	6	0	6.7	-0.4
AVA	270	0	2	2.0	1.3	174	0	2	0	8.3	1.5
AVE	181	2	6	2.1	1.7	110	0	5	0	7.5	1.9
AVN	103	0	46	1.5	0.7	103	0	47	0	11.4	0.5
AXF	20	0	35	1.4	-0.3	20	0	35	0	5.8	2.9
AZA	709	2	15	2.6	0.8	592	0	5	0	8.1	0.4
BAL	227	0	7	1.2	0.5	192	0	8	0	6.0	0.5
BAW	803	0	12	1.6	-0.2	731	0	13	0	7.0	0.4
BSK	39	3	8	2.5	0.6	36	0	22	0	12.9	0.7
BWA	311	1	3	1.5	0.6	223	0	3	0	7.7	0.6
CAL	90	0	1	1.9	0.5	89	0	0	0	5.6	0.6
CCA	264	2	12	2.0	0.3	280	1	59	0	12.2	-0.1
CES	355	1	6	1.5	0.2	364	1	7	0	8.0	0.0
CFC	30	0	20	2.0	0.4	26	0	19	0	6.4	0.7
CFG	824	1	5	1.7	-0.4	655	0	5	0	7.3	0.3
CGA	36	0	0	1.1	-0.2	35	0	0	0	4.9	1.0
CGF	37	0	3	1.5	-0.3	36	0	3	0	4.3	0.2
CGH	92	0	2	1.7	-0.4	92	0	1	0	5.4	0.9
CIU	25	4	20	1.7	-0.3	23	0	48	0	16.4	4.1
CKS	264	0	100	2.6	1.9	267	0	43	0	4.8	1.6
CLX	403	0	4	1.7	-0.2	351	0	6	0	6.8	-0.1
CMI	131	2	16	1.7	0.3	129	0	15	0	9.2	0.3
COA	1139	0	41	1.4	-0.3	1065	0	42	0	5.2	-0.1
CPA	54	0	11	1.1	0.5	53	0	11	0	5.8	1.2
CRL	465	0	8	1.6	0.5	360	1	11	0	8.3	0.9
CSN	178	2	12	1.8	-0.5	179	1	12	0	9.4	0.4
CUB	379	0	5	1.7	0.9	296	0	7	0	7.4	0.2
DAB	118	0	5	1.2	-0.1	114	0	5	0	4.8	0.4
DAI	108	0	0	0.9	0.1	104	0	0	0	4.5	0.8
DAL	3238	0	38	1.2	-0.2	3086	0	40	0	6.1	0.1
DBR	32	3	3	1.0	-0.3	30	0	3	0	5.8	0.1
DCE	175	0	6	1.4	0.5	152	0	8	0	7.5	0.1
DCS	32	9	16	1.4	-0.4	32	0	6	0	6.2	1.5
DHL	39	0	100	6.5	-6.4	35	0	20	0	11.6	0.3
DLH	1488	1	11	1.6	0.0	1345	0	12	0	6.6	0.7
EDW	109	0	7	1.7	0.3	98	0	5	0	6.8	0.9
EEZ	26	0	15	1.6	0.2	24	0	21	0	10.1	-0.9
EIA	263	1	13	2.7	1.2	256	0	100	0	17.8	4.6
ELY	172	1	2	1.5	0.3	171	0	4	0	8.8	0.3
ETH	56	0	7	1.5	0.6	57	2	12	0	9.6	1.9
EVA	128	1	7	1.1	0.3	134	0	8	0	8.5	0.6
EWW	76	0	4	1.1	0.5	77	0	8	0	8.7	-0.6

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
FDX	2087	0	44	1.3	0.4	2087	0	44	0	7.2	0.4
FGS	96	0	1	1.3	0.5	92	0	1	0	5.7	0.9
FGZ	39	0	3	1.9	-0.3	37	0	0	0	5.2	1.0
FIN	212	0	6	1.7	0.2	208	1	6	0	6.5	0.2
FJI	757	1	51	1.2	0.3	748	0	51	0	7.8	0.9
FOM	456	0	27	1.6	-0.1	458	0	28	0	6.7	0.5
FWQ	23	0	52	1.0	-0.2	23	0	52	0	4.0	0.1
GAF	75	0	4	1.9	-1.2	76	1	11	0	8.2	1.7
GCO	311	0	20	1.4	0.3	314	0	100	0	8.3	0.5
GHA	104	0	4	1.3	-0.3	73	0	4	0	10.3	1.6
GRL	42	0	2	1.9	-0.1	44	0	2	0	6.1	0.6
GTI	186	1	13	1.7	0.2	186	0	13	0	6.9	1.1
GVF	21	0	0	1.0	-0.7	20	0	0	0	5.7	2.6
GVR	31	0	3	1.5	-0.2	30	0	0	0	7.9	3.3
GWW	53	0	2	1.3	-0.2	52	0	2	0	5.2	1.2
HAL	4717	0	38	1.3	-0.1	4668	0	38	0	6.8	0.8
IBE	3246	0	5	1.6	0.6	2070	0	6	0	7.4	0.5
ICE	888	0	2	1.4	-0.1	864	0	4	0	8.1	-0.1
IWD	372	1	3	1.5	0.0	238	0	2	0	6.1	0.9
JAA	135	1	4	1.8	1.2	133	0	2	0	6.1	2.0
JAL	2927	0	4	1.6	0.3	2907	0	4	0	7.5	0.6
JAZ	1086	0	4	1.6	1.1	1061	0	5	0	7.1	0.5
JBU	55	7	7	1.4	0.8	55	0	0	0	5.8	0.6
JMC	106	1	3	1.7	0.3	80	0	1	0	6.8	0.9
KAL	3125	0	7	1.6	0.1	3088	0	8	0	7.4	0.3
KLM	2182	0	3	1.6	0.4	1713	0	4	0	7.3	0.6
LAN	488	0	5	1.9	-0.3	483	0	5	0	5.7	0.6
LAP	48	0	13	1.8	0.1	47	0	13	0	8.0	-1.5
LDA	70	0	3	1.9	0.4	58	0	0	0	5.0	1.4
LDI	610	0	5	1.8	0.0	464	0	4	0	6.9	0.6
LIB	630	1	5	1.8	1.2	423	0	4	0	6.3	0.8
LOB	21	0	90	3.3	-3.1	20	0	15	0	8.4	0.3
LOT	187	1	5	1.8	-1.0	181	1	8	0	9.5	-0.4
LTU	824	2	6	1.5	0.0	695	0	4	0	7.1	0.7
LXR	81	0	4	1.7	0.3	52	0	4	0	6.7	0.8
MAS	324	0	4	1.3	0.1	323	0	5	0	7.0	0.5
MON	83	1	6	1.5	0.5	61	0	10	0	7.9	0.8
MPD	589	1	4	1.5	0.0	413	0	4	0	7.4	0.4
MPH	756	0	2	1.6	-0.5	674	0	4	0	7.7	0.5
MYT	369	1	2	1.2	0.0	312	0	3	0	7.9	1.3
NCA	972	0	4	1.8	0.3	758	0	5	0	7.7	0.3
NGA	57	2	4	1.9	0.1	37	0	0	0	6.6	1.1
NWA	9684	0	9	1.6	0.4	9605	0	9	0	7.6	0.3
NZL	3882	0	13	1.7	0.0	3882	0	12	0	5.5	0.7
OAE	212	0	38	1.5	-0.2	213	0	40	0	7.4	0.9
PAC	718	1	19	1.8	0.7	725	0	18	0	7.9	0.4
PAL	1248	0	5	1.6	0.2	1160	0	6	0	7.5	0.8
PAO	280	0	51	1.3	0.1	280	1	51	0	9.4	0.5
PUA	28	0	18	2.0	-0.4	26	0	35	0	23.2	7.3
QFA	2642	0	49	1.4	0.3	2653	0	49	0	5.6	0.6
RAF	56	0	2	2.3	1.3	56	0	5	0	9.6	1.0
RAM	286	0	2	1.4	0.2	152	0	5	0	8.0	0.6
RCH	388	2	100	3.7	-0.4	353	0	100	0	12.2	2.6
RRR	153	1	9	1.7	0.4	147	0	10	0	7.8	0.8
RYN	131	1	44	3.0	-0.6	123	0	41	0	5.9	0.9
RZO	536	1	3	2.1	0.6	267	0	1	0	7.0	0.2
SAA	364	1	4	1.5	-0.1	299	0	3	0	6.6	0.5
SIA	371	0	2	1.4	0.2	379	0	1	0	6.1	0.4
SLR	226	0	7	1.1	0.5	206	0	9	0	7.7	0.3

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
SOO	30	3	7	2.5	1.3	57	0	5	0	8.9	0.8
SQC	41	0	0	1.5	0.7	41	0	0	0	3.9	0.4
SSV	55	0	5	2.0	0.3	59	0	5	0	6.3	0.8
SVA	26	0	8	1.6	0.0	29	0	21	0	9.4	1.1
TAG	57	0	19	1.5	-0.1	58	0	24	0	7.5	1.1
TAP	824	0	4	1.5	-0.2	307	0	4	0	8.6	0.7
TCV	29	0	7	2.2	1.7	24	0	4	0	6.8	0.0
THA	129	0	5	1.7	-0.2	129	0	6	0	7.8	0.9
THT	135	0	24	1.9	0.7	134	0	25	0	7.4	1.3
TPA	38	0	3	0.9	0.4	31	0	3	0	6.0	0.4
TSC	330	1	2	1.5	0.0	296	0	4	0	8.8	1.1
UAL	236866	0	96	1.1	-0.1	236659	0	96	0	4.6	0.4
UPS	2018	1	52	1.6	0.3	1998	0	51	0	7.2	0.5
USA	188	1	2	1.4	0.1	149	1	5	0	9.1	0.6
VIR	241	1	2	1.6	0.1	226	0	3	0	7.6	0.6
VRG	107	3	16	2.2	0.7	99	1	56	0	9.7	0.8
VVR	73	4	25	2.2	1.4	68	0	21	0	5.3	0.7
WOA	335	1	9	1.7	0.4	326	0	11	0	8.1	1.2
YSS	174	2	67	1.6	0.8	132	0	5	0	7.0	0.7
9VS	70	0	0	1.2	0.0	68	0	0	0	4.6	1.1
AR	1777	0	100	3.3	3.1	1765	0	5	0	6.7	0.7
AU	35720	0	13	1.1	0.5	36437	0	13	0	4.9	0.5
EU	147829	0	24	1.2	0.3	147807	0	23	0	4.5	0.4
KL	3823	0	6	1.3	0.8	3813	0	6	0	5.9	0.5
LH	2924	0	10	1.5	1.0	2906	0	10	0	4.8	0.6
MK	3931	0	19	1.5	1.1	3924	0	7	0	6.7	1.0
SA	5131	0	42	1.7	1.1	5118	0	7	0	6.5	0.7
TN	41	2	22	2.4	-0.1	39	3	26	0	8.9	2.1
N	1710	1	14	1.8	0.4	1681	0	13	0	6.3	0.8
US ACARS	1025974	1	61	1.3	0.4	1025970	0	61	0	5.0	0.5

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	143	0	27	1.3	-0.1	133	0	29	0	5.6	0.5
ACA	35	0	23	1.9	-0.1	31	0	23	0	9.4	-0.6
AFR	71	0	4	1.4	0.4	61	0	7	0	5.6	1.4
ANZ	145	0	29	1.5	-0.4	149	0	30	0	8.7	0.5
ATN	23	0	39	5.1	-2.6	22	0	5	0	9.2	3.4
AXF	28	0	64	1.3	-0.5	28	0	64	0	6.8	1.4
BAW	26	0	8	2.2	-0.9	26	0	8	0	7.3	0.0
CES	28	0	21	1.4	0.2	27	0	19	0	6.0	0.4
CFC	43	2	9	1.7	0.3	39	0	8	0	5.2	0.8
CFG	48	4	10	1.1	-0.2	40	0	8	0	8.3	0.6
CMI	23	0	9	2.6	-0.8	21	0	5	0	8.2	1.8
COA	27	0	48	0.8	-0.4	26	0	46	0	4.9	-0.2
DAL	161	0	50	1.1	-0.1	158	0	52	0	5.2	0.3
DLH	144	1	13	1.6	-0.1	140	0	10	0	6.3	0.6
EIA	32	3	31	3.7	2.6	30	0	100	0	19.8	3.6
EWW	70	1	3	1.3	0.6	74	1	3	0	6.9	0.9
FDX	455	0	27	1.4	0.5	466	0	29	0	8.1	0.3
FJI	26	0	69	1.8	-0.2	26	0	69	0	6.5	0.6
GAF	28	0	7	1.9	-0.3	38	0	3	0	6.9	0.3
GCO	161	1	6	1.2	0.2	165	1	100	0	11.3	1.2
HAL	60	0	43	1.7	0.1	59	0	41	0	7.1	2.8
IBE	36	6	8	1.2	0.1	26	0	8	0	11.6	-0.8
ICE	22	0	0	0.6	-0.1	22	0	0	0	5.3	1.7
JAL	54	0	2	1.3	0.5	53	0	2	0	7.0	1.2
JAZ	78	0	4	1.8	1.0	79	0	4	0	8.1	-1.1
KAL	43	2	14	1.1	0.3	42	0	17	0	10.8	0.1
KIW	40	18	50	3.9	1.0	39	0	33	0	9.4	1.4
KLM	45	0	2	1.4	0.5	39	0	3	0	6.2	0.5
LIB	30	3	13	2.8	0.6	23	0	0	0	5.0	0.3
MAS	32	3	38	0.9	0.0	32	0	34	0	6.2	0.4
MPH	54	2	6	1.1	0.2	51	0	4	0	7.0	-0.3
NCA	108	1	1	1.5	0.4	86	1	2	0	5.8	-0.1
NWA	202	2	11	1.6	0.4	196	0	9	0	6.3	-0.5
NZL	22420	0	58	1.5	0.6	22419	0	58	0	5.8	-0.2
PAC	44	7	14	1.1	0.0	48	0	10	0	11.0	-2.5
PAL	42	0	26	2.3	-0.8	36	0	19	0	5.7	0.5
QFA	165	1	58	1.5	0.1	165	0	58	0	5.7	0.8
RCH	138	3	100	3.2	-0.8	122	2	100	0	12.9	1.3
RRR	160	13	26	2.6	0.8	152	1	15	0	9.8	0.8
SAA	40	5	8	1.5	-1.0	40	0	3	0	5.1	0.7
SIA	53	0	6	1.2	0.1	54	0	6	0	4.9	1.2
UAL	502456	0	99	1.2	-0.1	501887	0	99	0	4.0	0.4
UPS	82	0	55	1.4	0.5	82	0	56	0	5.9	0.3
VVP	31	0	48	3.6	-1.0	33	0	33	0	12.3	5.1
WOA	40	0	10	2.1	0.7	38	3	16	0	10.3	1.5
AR	1036	0	100	1.9	1.5	1031	0	48	0	4.1	0.6
AU	22135	0	50	1.3	0.5	22548	0	50	0	4.6	-0.1
EU	564514	0	68	0.9	0.2	562534	0	67	0	3.6	0.0
KL	2678	0	56	1.4	0.2	2667	0	56	0	4.3	0.2
LH	1280	0	59	1.3	0.6	1269	0	59	0	4.2	0.6
MK	2714	0	56	1.3	0.6	2710	0	51	0	4.1	0.7
SA	3669	0	71	1.7	0.7	3669	0	59	0	4.7	-0.1
N	38	18	68	6.1	4.4	40	0	30	0	8.1	2.0
US ACARS	1764567	0	76	1.1	0.2	1760257	0	76	0	4.0	0.3

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 51824

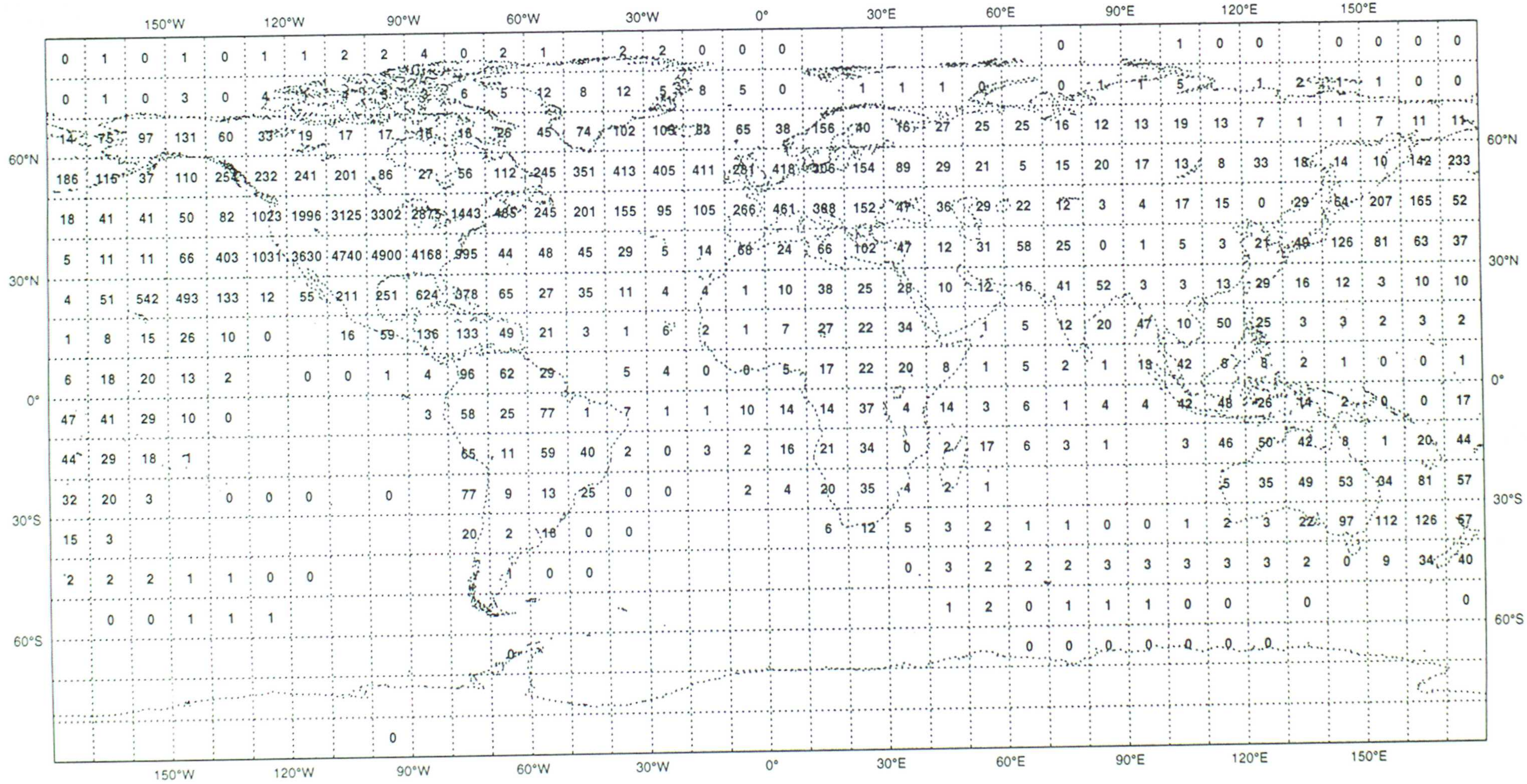

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 1 0 1 0 1 1 2 2 4 0 2 1 2 2 0 0 0 0 1 0 0 0 0 0 0
0 1 0 3 0 4 6 5 12 8 12 5 8 5 0 1 1 1 0 0 1 1 5 1 2 1 1 0 0
14 75 97 131 60 33 19 17 17 18 18 26 45 74 102 109 83 65 38 156 40 16 27 25 25 16 12 13 19 13 7 1 1 7 11 11
186 115 37 110 254 232 241 201 86 27 56 112 245 351 413 405 411 281 418 306 154 89 29 21 5 15 20 17 13 8 33 18 14 10 142 233
18 41 41 50 82 1023 1996 3125 3302 2875 1443 485 245 201 155 95 105 266 461 388 152 47 36 29 22 12 3 4 17 15 0 29 64 207 165 52
5 11 11 66 403 1031 3630 4740 4900 4168 995 44 48 45 29 5 14 68 24 66 102 47 12 31 58 25 0 1 5 3 21 40 126 81 63 37
4 51 542 493 133 12 55 211 251 624 378 65 27 35 11 4 4 1 10 38 25 28 10 12 16 41 52 3 3 13 29 16 12 3 10 10
1 8 15 26 10 0 16 59 136 133 49 21 3 1 6 2 1 7 27 22 34 1 5 12 20 47 10 50 25 3 3 2 3 2
6 18 20 13 2 0 0 1 4 96 62 29 5 4 0 0 5 17 22 20 8 1 5 2 1 19 42 8 8 2 1 0 0 1
47 41 29 10 0 3 58 25 77 1 7 1 1 10 14 14 37 4 14 3 6 1 4 4 42 48 26 14 2 0 0 17
44 29 18 1 65 11 59 40 2 0 3 2 16 21 34 0 2 17 6 3 1 3 46 50 42 8 1 20 44
32 20 3 0 0 0 0 77 9 13 25 0 0 2 4 20 35 4 2 1 5 35 49 53 34 81 57
15 3 20 2 18 0 0 6 12 5 3 2 1 1 0 0 1 2 3 22 97 112 126 57
2 2 2 1 1 0 0 1 0 0 0 3 2 2 2 3 3 3 3 3 2 0 9 34 40
0 0 1 1 1 1 2 0 1 1 1 0 0 0 0
0 0 0 0 0 0 0 0
0

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 96145

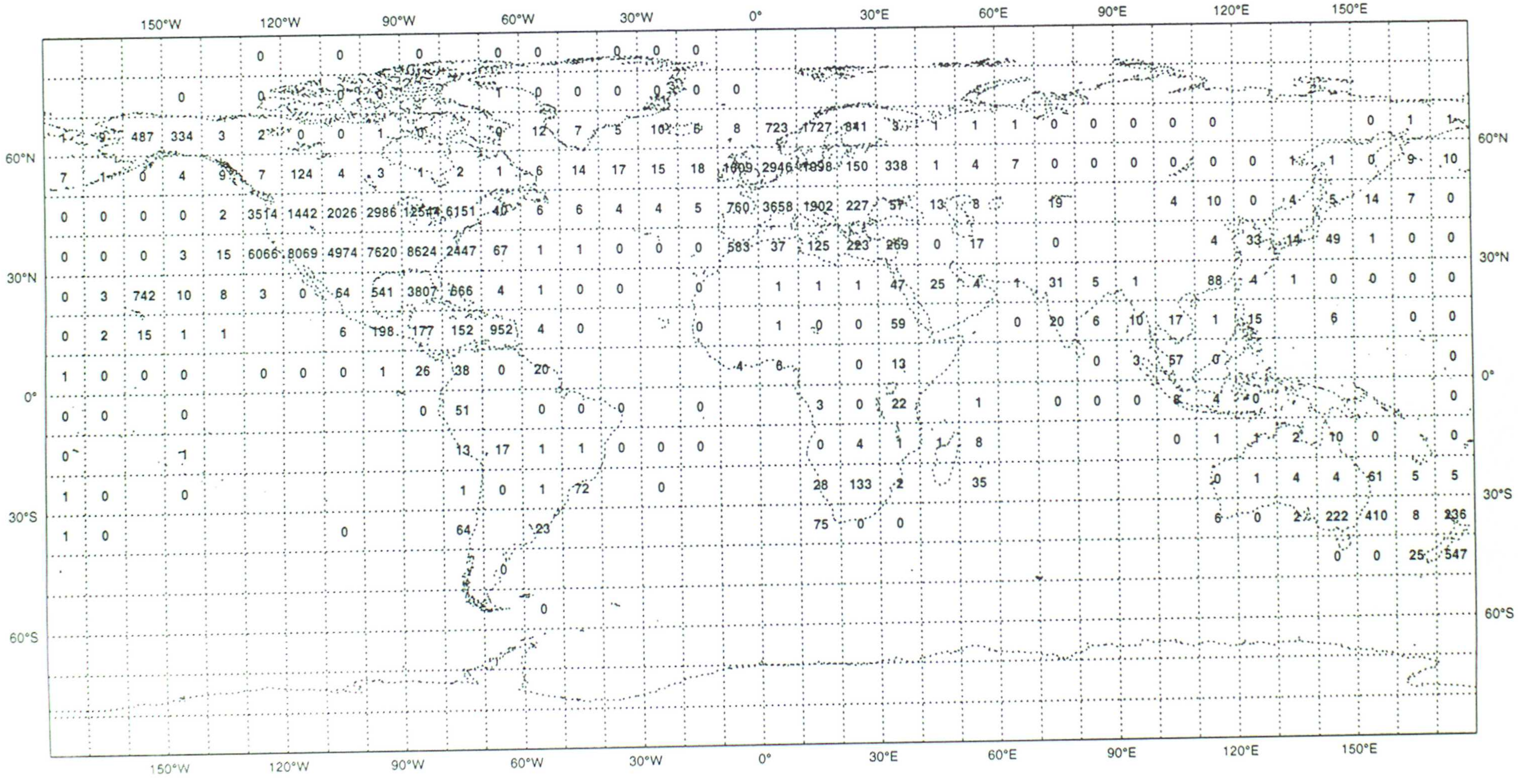

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

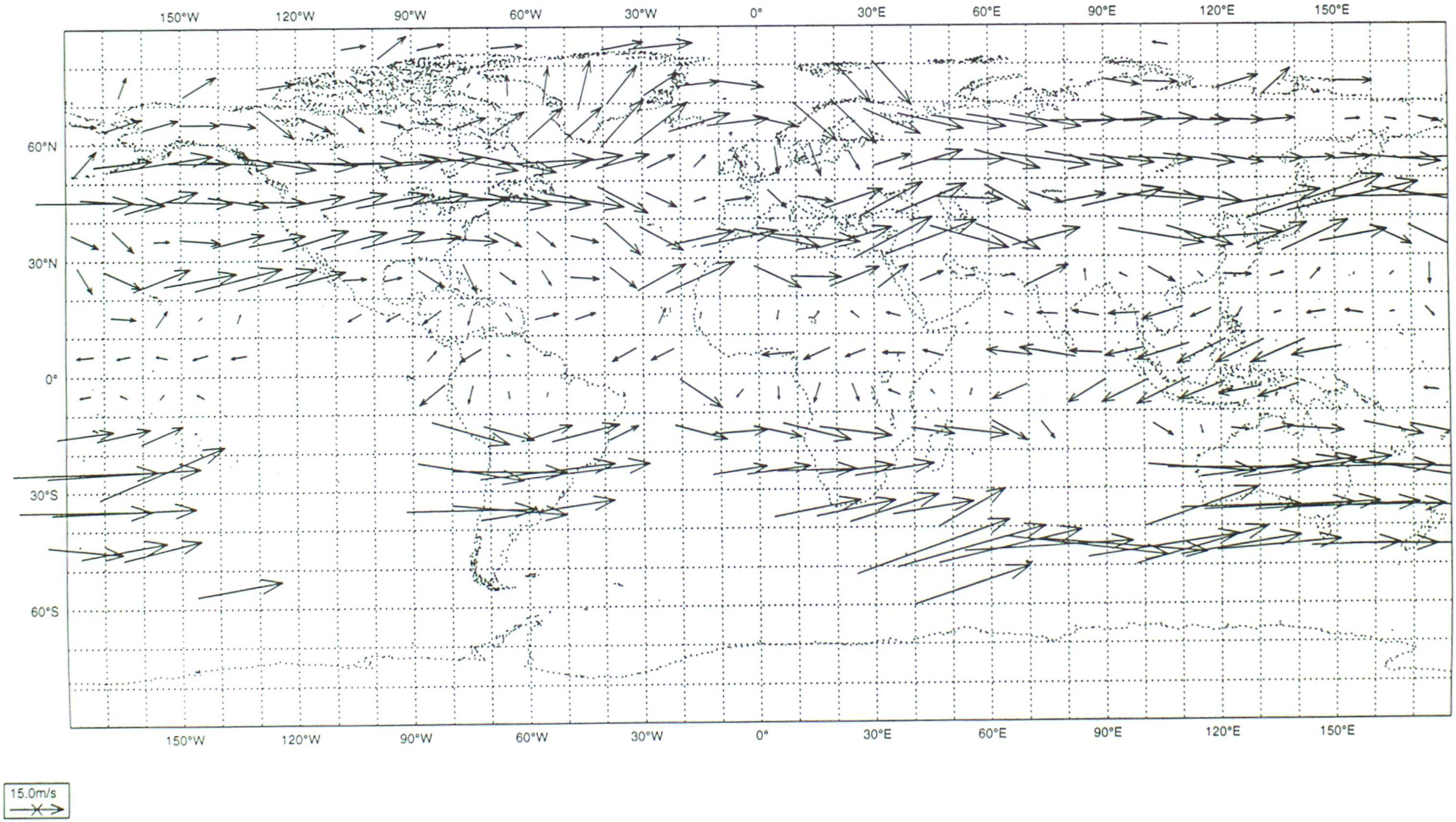

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

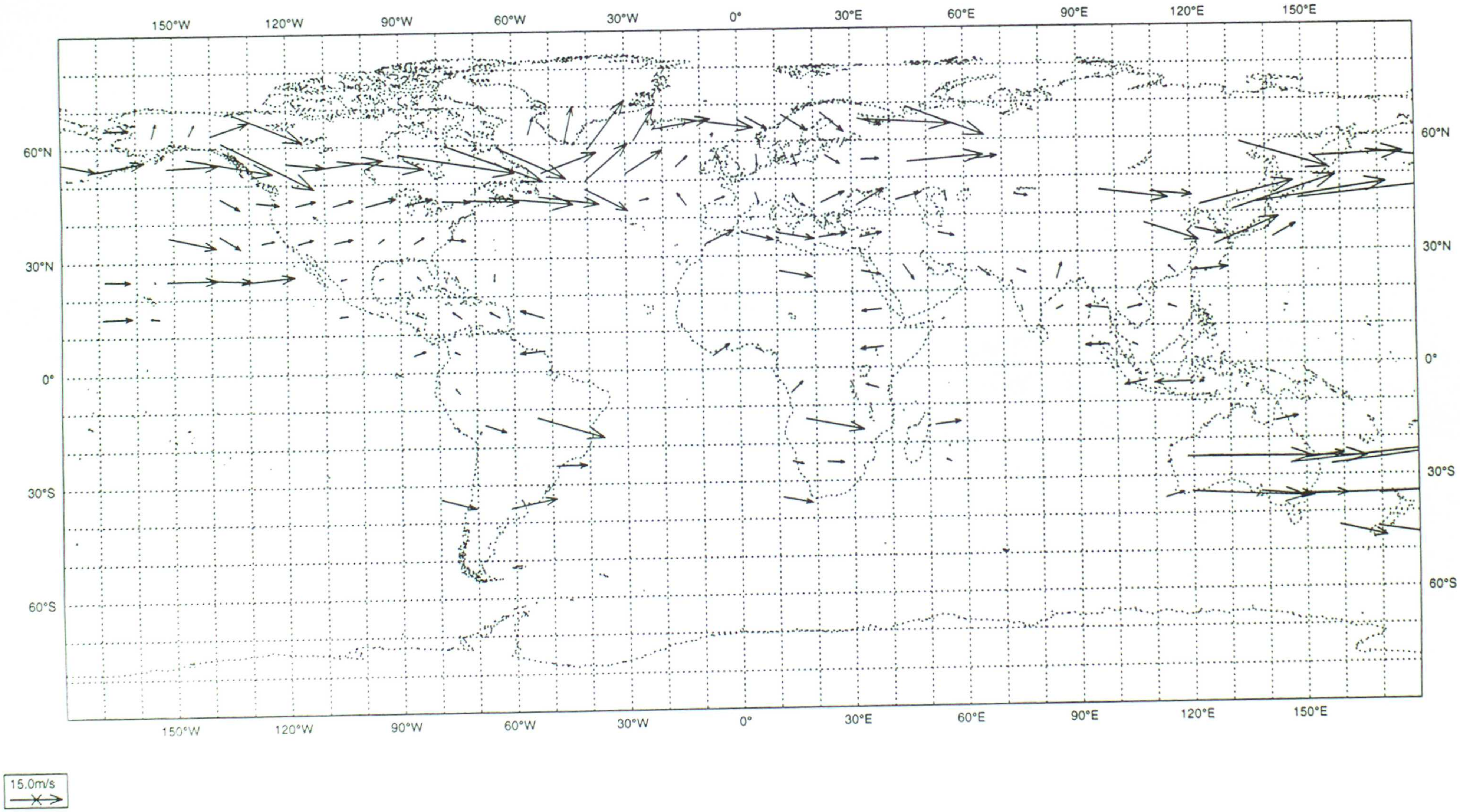

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

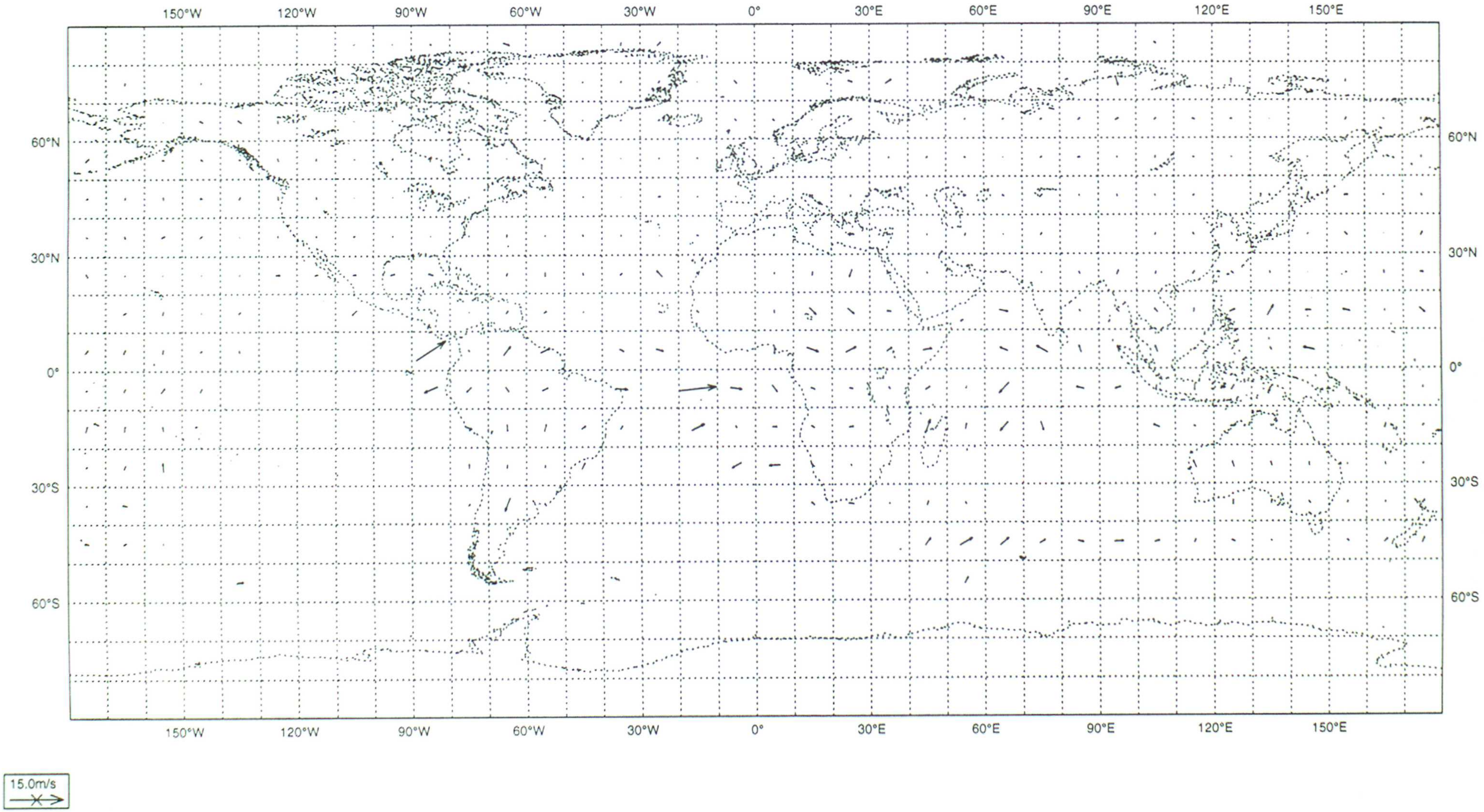

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

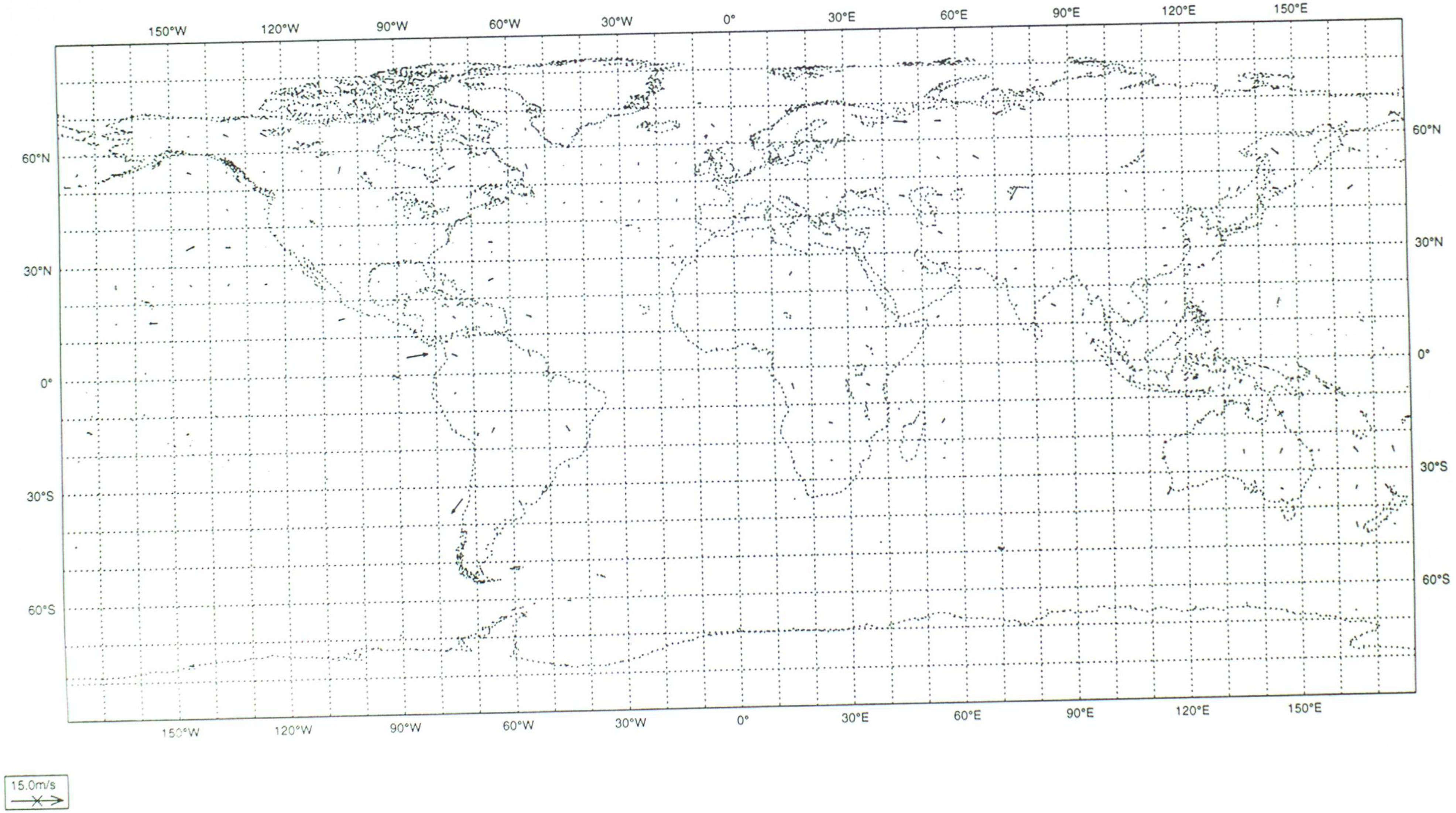

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

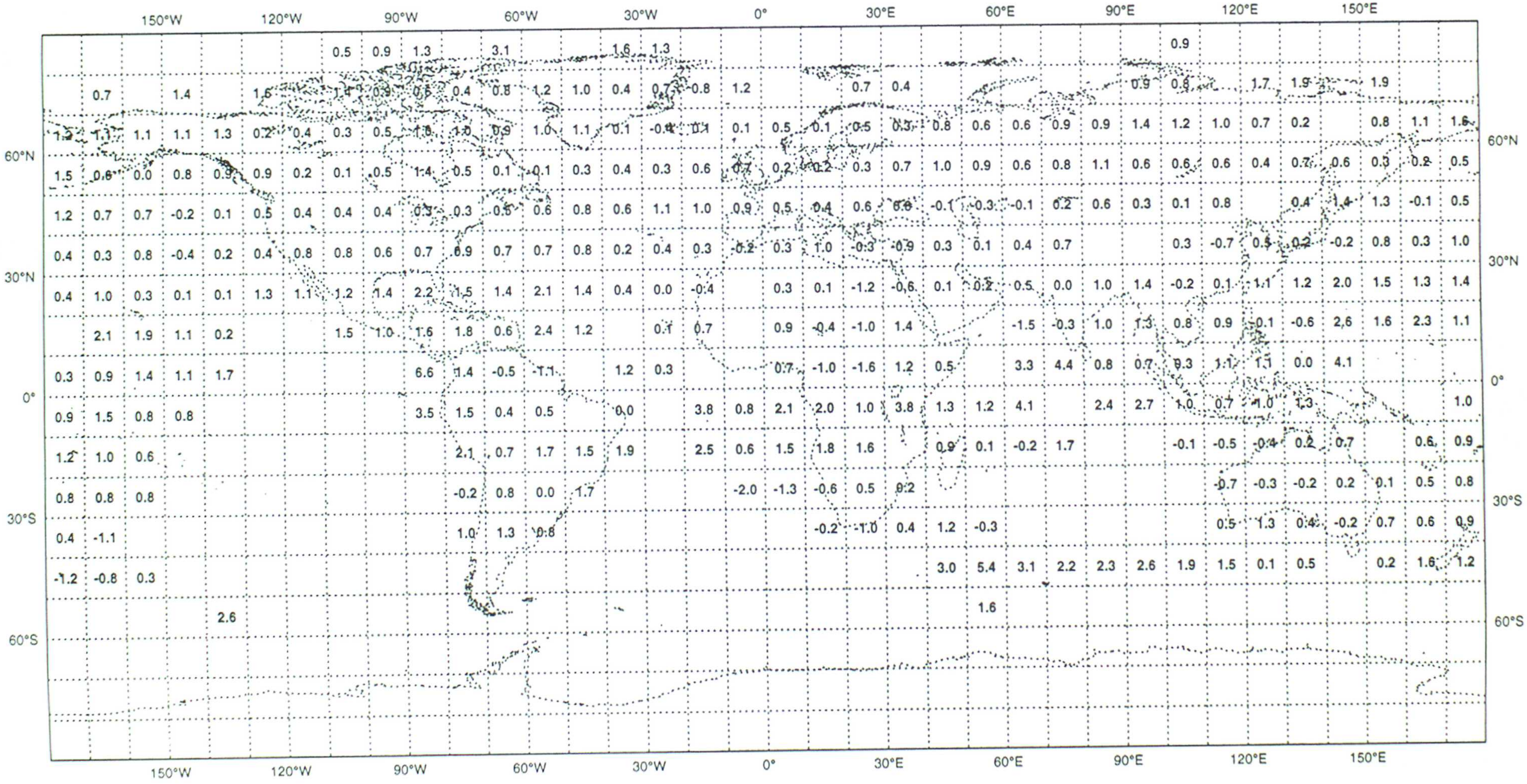

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

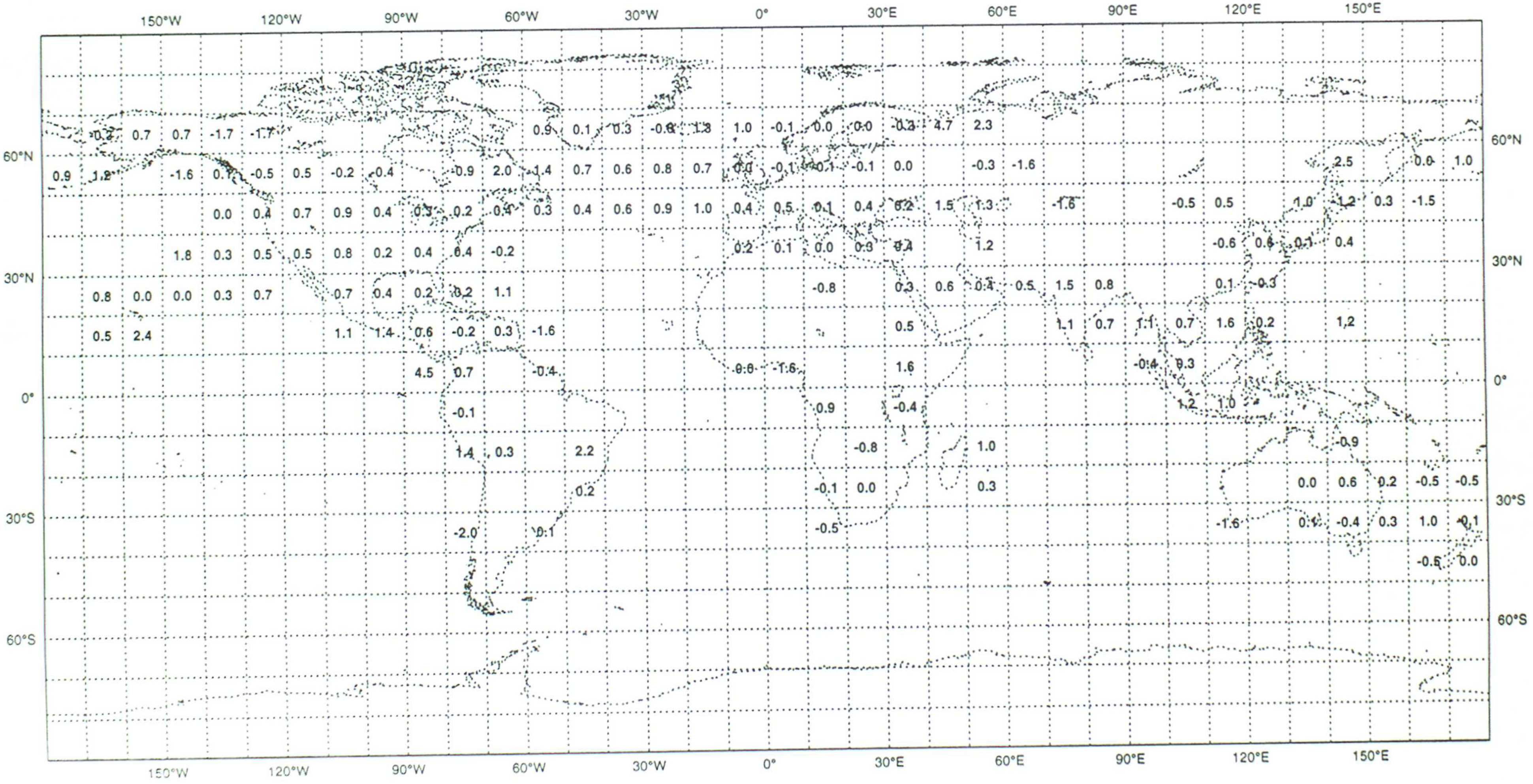

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.2 0.7 0.7 -1.7 -1.7 0.9 0.1 0.3 -0.8 1.3 1.0 -0.1 0.0 0.0 -0.3 4.7 2.3
0.9 1.2 -1.6 0.1 -0.5 0.5 -0.2 -0.4 -0.9 2.0 -1.4 0.7 0.6 0.8 0.7 0.0 -0.1 -0.1 -0.1 0.0 -0.3 -1.6 2.5 0.0 1.0
0.0 0.4 0.7 0.9 0.4 0.3 0.2 0.4 0.3 0.4 0.6 0.9 1.0 0.4 0.5 0.1 0.4 0.2 1.5 1.3 -1.6 -0.5 0.5 1.0 -1.2 0.3 -1.5
1.8 0.3 0.5 0.5 0.8 0.2 0.4 0.4 -0.2 0.2 0.1 0.0 0.3 0.4 1.2 -0.6 0.6 0.1 0.4
0.8 0.0 0.0 0.3 0.7 -0.7 0.4 0.2 0.2 1.1 -0.8 0.3 0.6 0.4 0.5 1.5 0.8 0.1 -0.3
0.5 2.4 1.1 1.4 0.6 -0.2 0.3 -1.6 0.5 1.1 0.7 1.1 0.7 1.6 0.2 1.2
4.5 0.7 -0.4 0.0 -1.6 1.6 -0.4 0.3
-0.1 0.9 -0.4 1.2 1.0
1.4 0.3 2.2 -0.8 1.0 -0.9
0.2 -0.1 0.0 0.3 0.0 0.6 0.2 -0.5 -0.5
-2.0 0.1 -0.5 -1.6 0.1 -0.4 0.3 1.0 -0.1
-0.5 0.0

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

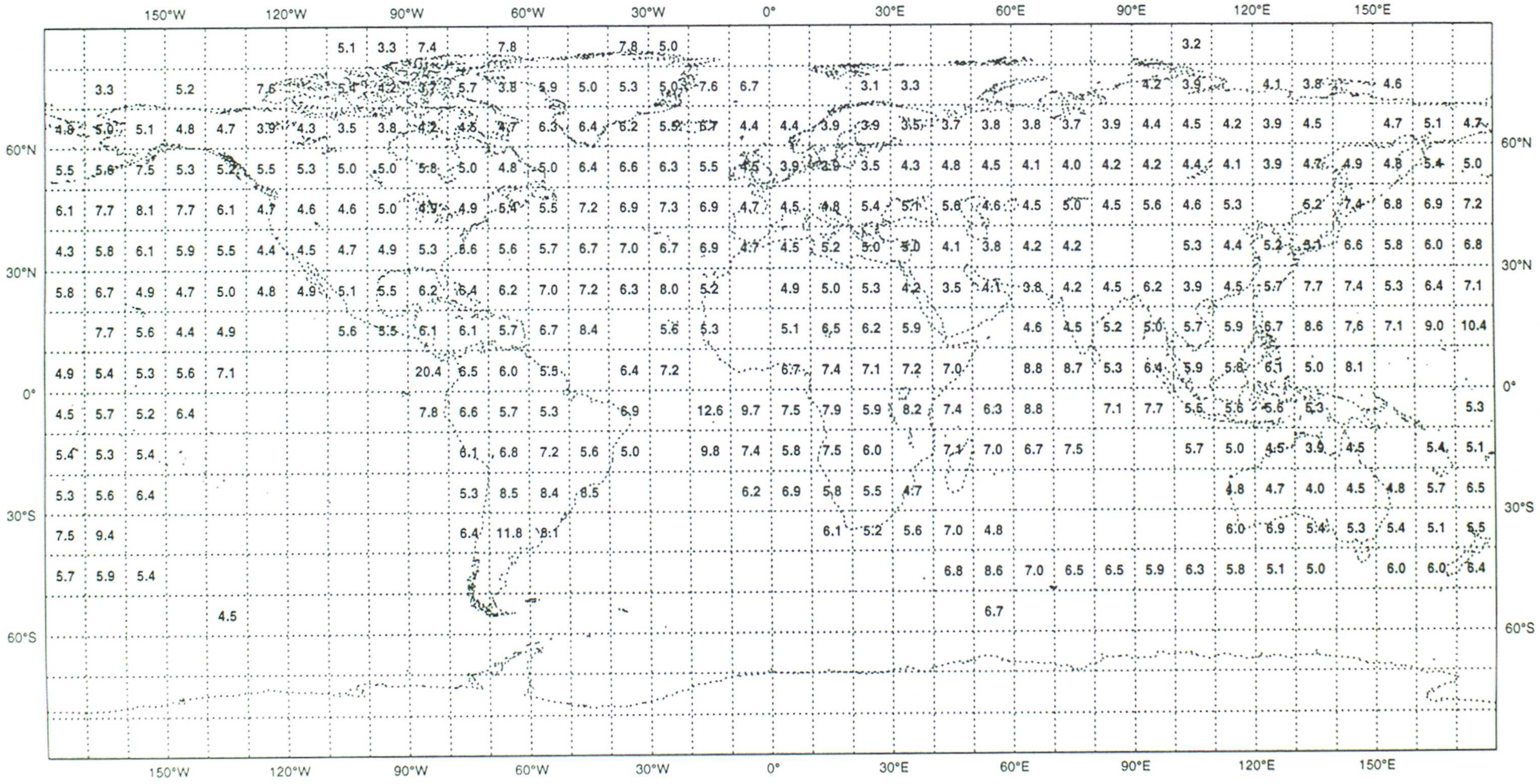

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5.1 3.3 7.4 7.8 7.8 5.0 3.2
3.3 5.2 7.6 5.4 4.2 5.7 5.7 3.8 5.9 5.0 5.3 5.0 7.6 6.7 3.1 3.3 4.2 3.9 4.1 3.8 4.6
4.8 5.0 5.1 4.8 4.7 3.9 4.3 3.5 3.8 4.2 4.5 4.7 6.3 6.4 6.2 5.5 5.7 4.4 4.4 3.9 3.9 3.5 3.7 3.8 3.8 3.7 3.9 4.4 4.5 4.2 3.9 4.5 4.7 5.1 4.7
5.5 5.6 7.5 5.3 5.2 5.5 5.3 5.0 5.0 5.8 5.0 4.8 5.0 6.4 6.6 6.3 5.5 4.5 3.9 2.9 3.5 4.3 4.8 4.5 4.1 4.0 4.2 4.2 4.4 4.1 3.9 4.7 4.9 4.8 5.4 5.0
6.1 7.7 8.1 7.7 6.1 4.7 4.6 4.6 5.0 4.9 4.9 5.4 5.5 7.2 6.9 7.3 6.9 4.7 4.5 4.8 5.4 5.1 5.6 4.6 4.5 5.0 4.5 5.6 4.6 5.3 5.2 7.4 6.8 6.9 7.2
4.3 5.8 6.1 5.9 5.5 4.4 4.5 4.7 4.9 5.3 5.6 5.6 5.7 6.7 7.0 6.7 6.9 4.7 4.5 5.2 5.0 5.0 4.1 3.8 4.2 4.2 5.3 4.4 5.2 5.1 6.6 5.8 6.0 6.8
5.8 6.7 4.9 4.7 5.0 4.8 4.9 5.1 5.5 6.2 6.4 6.2 7.0 7.2 6.3 8.0 5.2 4.9 5.0 5.3 4.2 3.5 4.1 3.8 4.2 4.5 6.2 3.9 4.5 5.7 7.7 7.4 5.3 6.4 7.1
7.7 5.6 4.4 4.9 5.6 5.5 6.1 6.1 5.7 6.7 8.4 5.6 5.3 5.1 6.5 6.2 5.9 4.6 4.5 5.2 5.0 5.7 5.9 6.7 8.6 7.6 7.1 9.0 10.4
4.9 5.4 5.3 5.6 7.1 20.4 6.5 6.0 5.5 6.4 7.2 6.7 7.4 7.1 7.2 7.0 8.8 8.7 5.3 6.4 5.9 5.8 6.1 5.0 8.1
4.5 5.7 5.2 6.4 7.8 6.6 5.7 5.3 6.9 12.6 9.7 7.5 7.9 5.9 8.2 7.4 6.3 8.8 7.1 7.7 5.5 5.6 5.6 6.3 5.3
5.4 5.3 5.4 6.1 6.8 7.2 5.6 5.0 9.8 7.4 5.8 7.5 6.0 7.1 7.0 6.7 7.5 5.7 5.0 4.5 3.9 4.5 5.4 5.1
5.3 5.6 6.4 5.3 8.5 8.4 8.5 6.2 6.9 5.8 5.5 4.7 4.8 4.7 4.0 4.5 4.8 5.7 6.5
7.5 9.4 6.4 11.8 8.1 6.1 5.2 5.6 7.0 4.8 6.0 6.9 5.4 5.3 5.4 5.1 5.5
5.7 5.9 5.4 6.8 8.6 7.0 6.5 6.5 5.9 6.3 5.8 5.1 5.0 6.0 6.0 6.4
4.5 6.7

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). SEPTEMBER 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

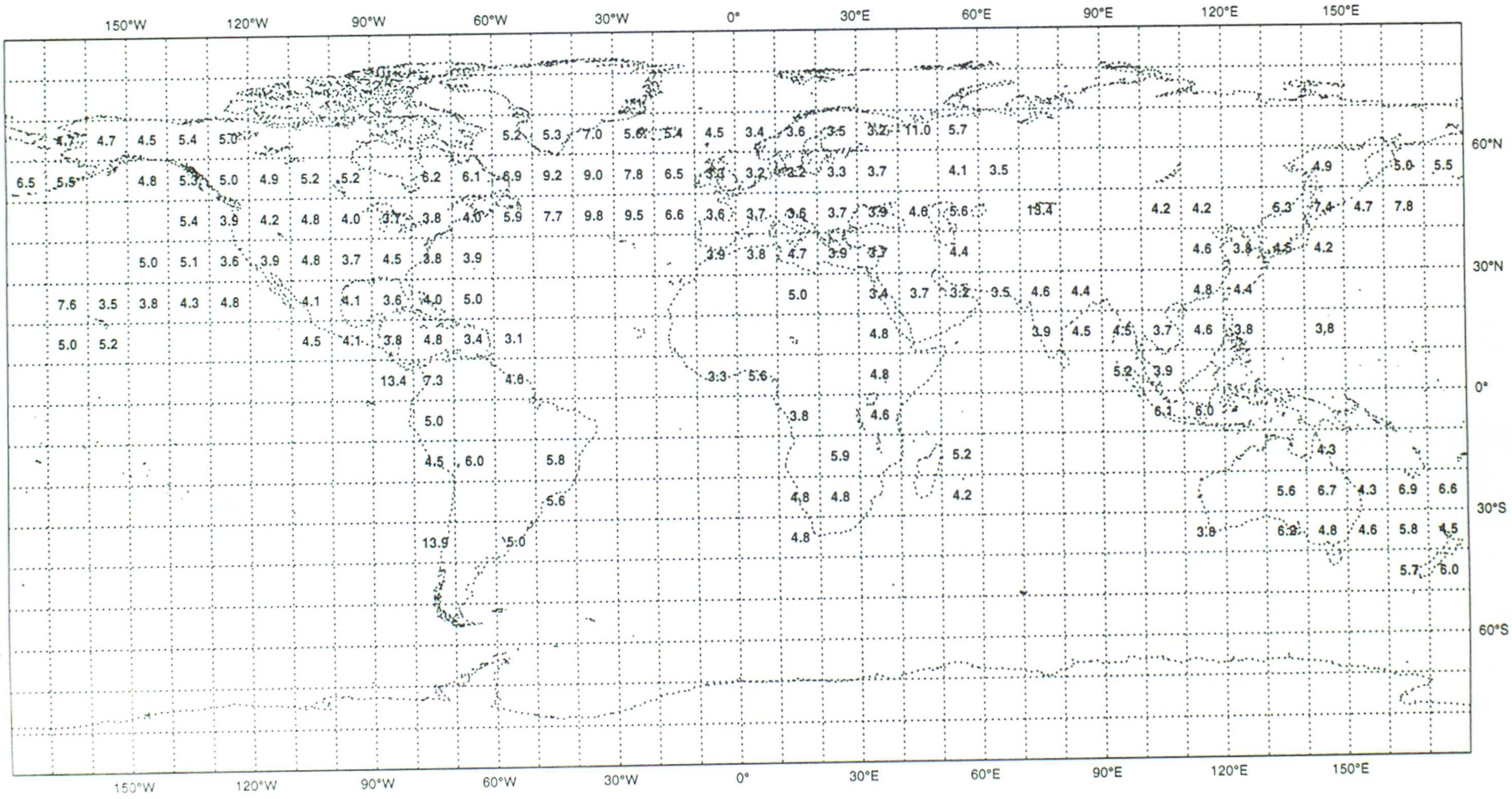

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.7 4.7 4.5 5.4 5.0 5.2 5.3 7.0 5.6 5.4 4.5 3.4 3.6 3.5 3.2 11.0 5.7
6.5 5.5 4.8 5.3 5.0 4.9 5.2 5.2 6.2 6.1 6.9 9.2 9.0 7.8 6.5 3.3 3.2 2.2 3.3 3.7 4.1 3.5 4.9 5.0 5.5
5.4 3.9 4.2 4.8 4.0 3.7 3.8 4.0 5.9 7.7 9.8 9.5 6.6 3.6 3.7 3.6 3.7 3.9 4.6 5.6 13.4 4.2 4.2 6.3 7.4 4.7 7.8
5.0 5.1 3.6 3.9 4.8 3.7 4.5 3.8 3.9 3.9 3.8 4.7 3.9 3.7 4.4 4.6 3.8 4.5 4.2
7.6 3.5 3.8 4.3 4.8 4.1 4.1 3.6 4.0 5.0 5.0 3.4 3.7 3.2 3.5 4.6 4.4 4.8 4.4
5.0 5.2 4.5 4.1 3.8 4.8 3.4 3.1 4.8 3.9 4.5 4.5 3.7 4.6 3.8 3,8
13.4 7.3 4.8 3.3 5.6 4.8 5.2 3.9
5.0 3.8 4.6 6.1 6.0
4.5 6.0 5.8 5.9 5.2 4.3
5.6 4.8 4.8 4.2 5.6 6.7 4.3 6.9 6.6
13.9 5.0 4.8 3.8 6.2 4.8 4.6 5.8 4.5
5.7 6.0

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
WPKD	00	Z	400	37/ -72	12	2	60.3	-36.1	70.3	5
26477	12	Z	30	56/ 31	12	0	69.6	186.4	199.0	5
32540	00	Z	250	53/ 159	3	0	117.5	57.3	130.7	6
34247	12	Z	1000	50/ 41	27	2	30.2	-41.8	51.6	9
42339	00	Z	70	26/ 73	10	1	148.7	51.6	157.4	4
42339	12	Z	70	26/ 73	11	2	131.2	194.7	234.8	5
42361	12	Z	250	26/ 78	18	0	97.9	-7.9	98.2	6
42369	00	Z	1000	27/ 81	18	8	13.3	-77.2	78.3	8
42379	00	Z	200	27/ 83	15	0	89.2	69.1	112.8	7
42379	12	Z	150	27/ 83	11	0	61.2	97.8	115.4	5
42397	00	Z	150	27/ 88	16	0	81.4	-43.4	92.3	4
42410	00	Z	70	26/ 92	20	0	114.7	86.3	143.6	4
42492	12	Z	1000	26/ 85	30	0	21.8	-43.0	48.3	6
42647	12	Z	50	23/ 73	11	0	93.2	201.2	221.7	7
42701	00	Z	150	23/ 85	16	0	84.3	-40.2	93.4	4
42867	00	Z	70	21/ 79	12	1	100.6	112.2	150.7	6
42971	00	Z	1000	20/ 86	25	0	21.3	-28.0	35.2	4
43003	00	Z	1000	19/ 73	27	2	13.7	-73.8	75.1	7
43003	12	Z	1000	19/ 73	27	3	12.9	-81.9	82.9	8
43014	00	Z	200	20/ 75	22	1	105.6	30.1	109.8	8
43014	12	Z	100	20/ 75	12	1	112.4	163.3	198.3	8
43150	00	Z	1000	18/ 83	1	28	0.0	-100.0	100.0	5
43150	12	Z	850	18/ 83	28	0	15.9	-29.6	33.6	4
43185	00	Z	30	16/ 81	10	1	86.7	255.6	269.9	5
43185	12	Z	50	16/ 81	11	0	73.7	228.6	240.2	6
43192	00	Z	1000	15/ 74	1	26	0.0	-97.0	97.0	8
43279	12	Z	50	13/ 80	11	1	120.1	185.4	220.9	7
43285	00	Z	100	13/ 75	16	0	121.5	-41.9	128.5	4
43285	12	Z	50	13/ 75	11	0	85.4	193.3	211.3	6
43311	00	Z	200	11/ 73	23	0	79.6	-77.7	111.2	5
43333	00	Z	150	12/ 93	22	1	96.3	-39.5	104.1	5
43346	00	Z	200	11/ 80	28	0	73.2	-48.1	87.6	4
43346	12	Z	50	11/ 80	13	1	84.7	197.4	214.8	5
43369	00	Z	100	8/ 73	10	1	139.5	-123.3	186.1	5
43371	12	Z	50	8/ 77	15	0	109.1	172.0	203.7	5
44292	00	Z	50	48/ 107	10	0	155.1	162.6	224.7	6
89592	00	Z	70	-67/ 93	25	2	96.7	117.8	152.4	5

Figure 8. TEMP 500 hPa geopotential mean daily count. SEPTEMBER 2002
All hours
Global average number of observations in 24 hours = 1177

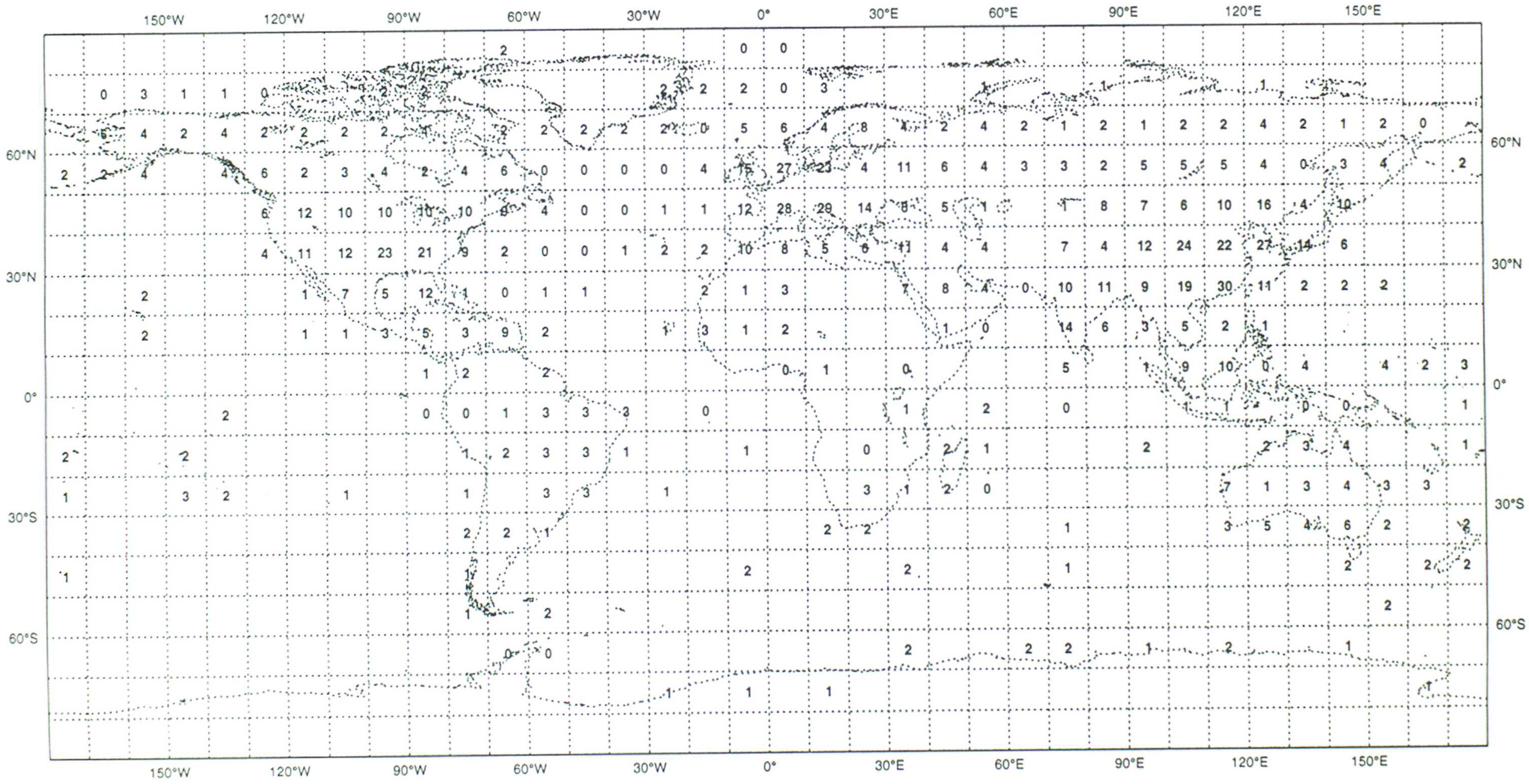

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 100.0 hPa
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.	

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	100	-5/ -81	28	0	100	-5.8	3.4	22.0	2
PSPIU	12	V	100	-5/ -81	30	0	100	-2.9	0.8	19.0	2
17351	00	V	200	37/ 35	29	0	100	-13.1	-6.5	21.6	2
42361	12	V	300	26/ 78	11	0	100	5.3	2.4	17.2	1
42410	12	V	300	26/ 92	15	0	100	1.1	-1.1	16.4	1
48455	12	V	100	14/ 101	10	0	100	15.2	0.8	16.6	1
48568	12	V	150	7/ 101	22	0	31	12.8	8.8	19.1	1
60360	12	V	200	37/ 8	16	0	100	7.8	-8.1	17.4	2
60559	12	V	300	33/ 7	10	0	100	-9.9	3.9	19.4	1
60590	12	V	700	31/ 3	19	0	100	-10.8	2.0	15.1	1
63741	00	V	150	-1/ 37	27	0	100	11.2	2.0	16.7	1
64458	12	V	250	2/ 16	16	0	100	0.5	-2.4	15.3	1
68263	12	V	300	-26/ 28	15	0	100	1.3	-3.0	17.9	1
68442	12	V	200	-29/ 26	14	0	100	-13.6	-0.5	17.0	2
68512	12	V	150	-30/ 18	14	0	100	-10.5	-0.7	15.6	1
83612	12	V	100	-20/ -55	23	0	100	9.9	0.9	16.1	1
93844	00	V	250	-46/ 168	29	0	6	6.1	0.5	15.4	1
98223	00	V	100	18/ 121	16	0	100	-18.3	-1.1	19.7	2

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. SEPTEMBER 2002
All hours
Global average number of observations in 24 hours = 1391

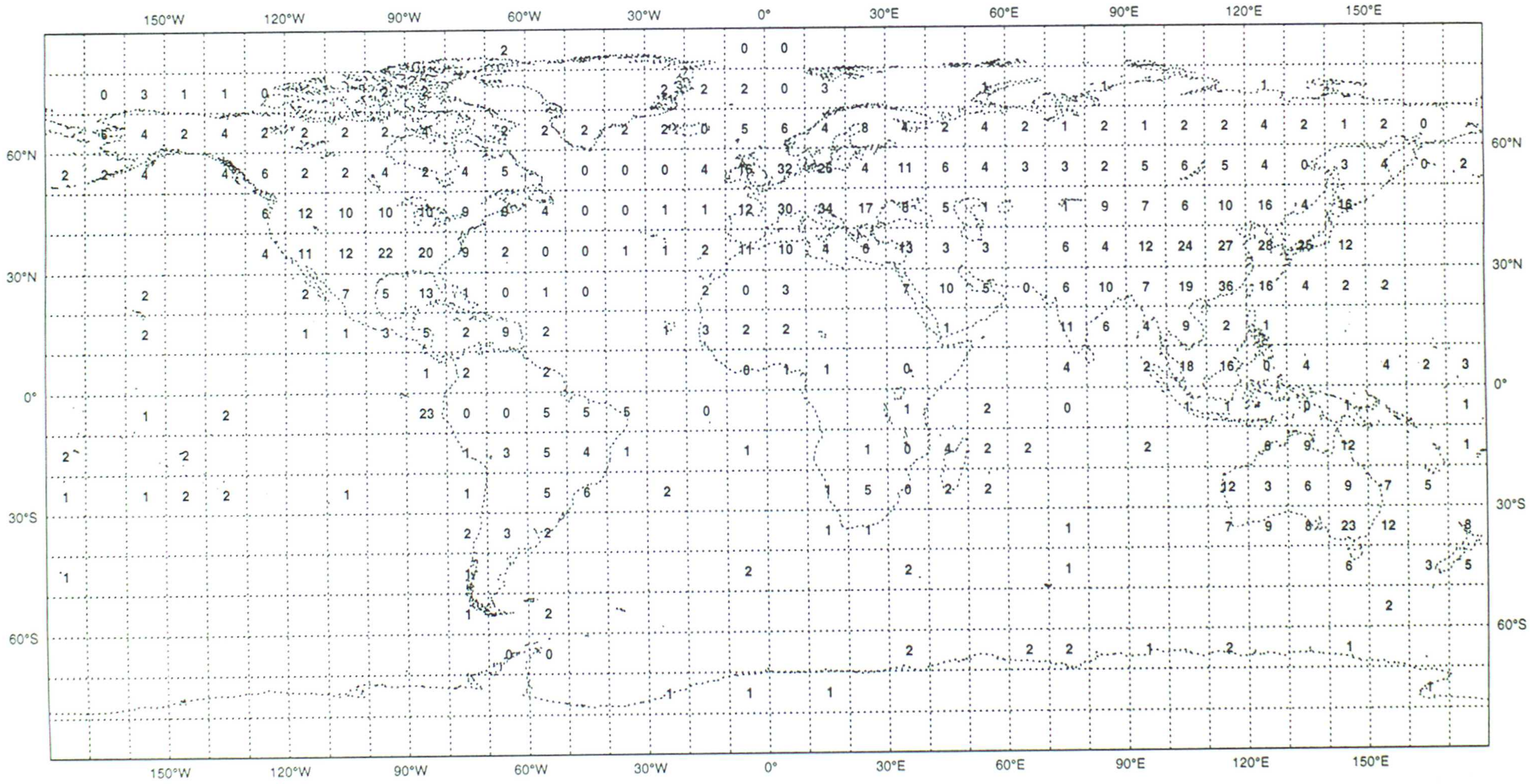

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 500.0 - 150.0 hPa

Element monitored :WIND DIRECTION in degrees

Parameters monitored

:NUM OBS :Average number of observations at all levels.

:BIAS :Mean difference of observations from background values from all levels.

:MAX SPREAD :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels

:SD :SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
10468	00	DD	52/ 12	24	13.4	6.8	11.3
10468	12	DD	52/ 12	25	12.8	3.1	9.0
17030	12	DD	41/ 36	28	10.3	1.8	7.6
29612	12	DD	55/ 78	19	22.6	3.2	6.1
48565	00	DD	8/ 98	20	11.5	10.0	18.2
48615	12	DD	6/ 102	21	11.4	9.3	21.9
59280	12	DD	24/ 113	18	11.6	8.0	20.1
62337	12	DD	31/ 34	22	-12.0	3.1	21.0
91413	12	DD	9/ 138	19	10.2	4.7	26.6

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: September 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:number of observations > 10.
Data Extracted	:Layer 701 - 1000 hPa 401 - 700 hPa 101 - 400 hPa
	:Mean wind
	:Mean observation minus background vector wind differences
	:Mean observation minus background speed differences
	:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. SEPTEMBER 2002
Global average number of observations in 24 hours = 48278

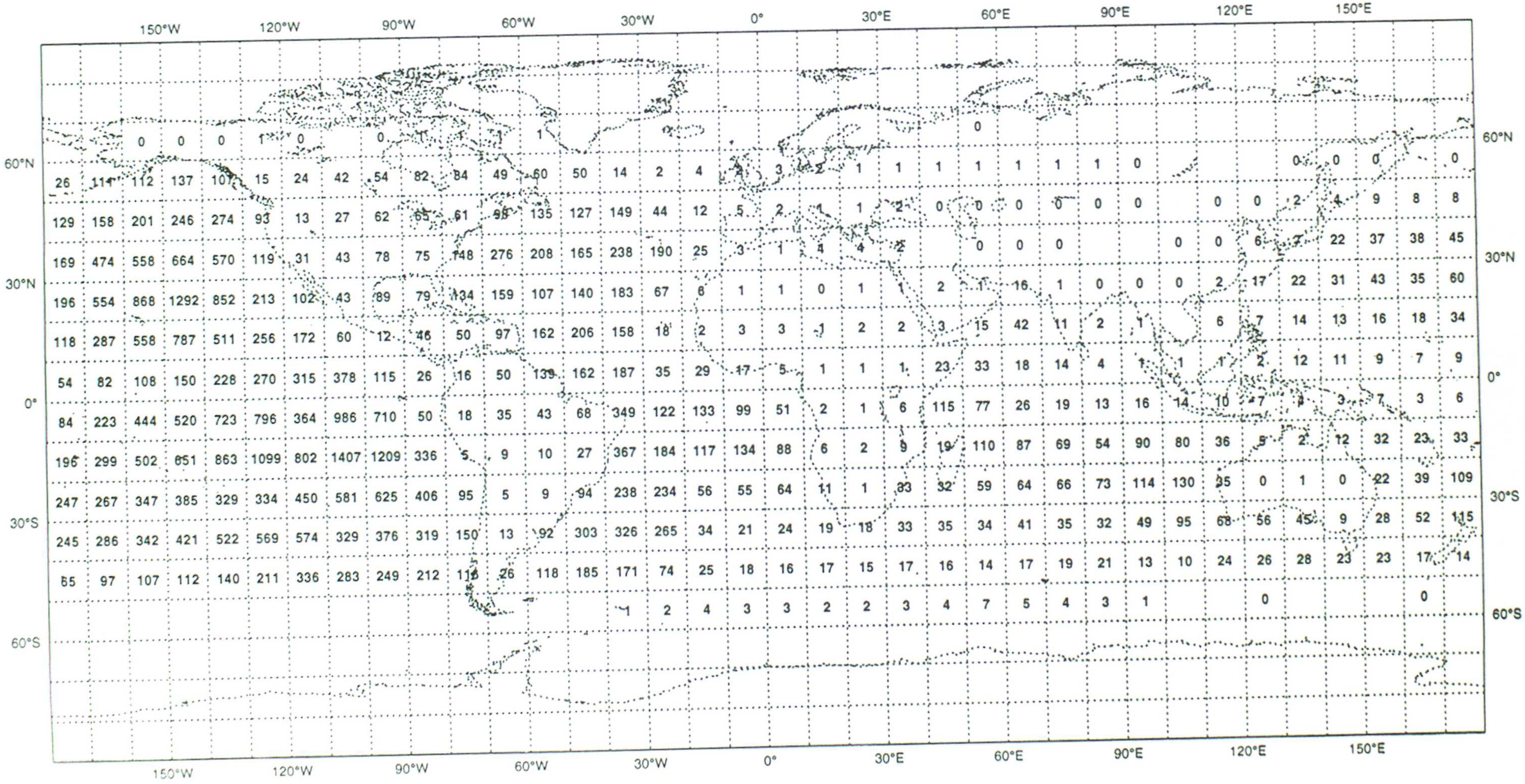

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0 0 0 1 0 0 1 1 1 1 0
26 114 112 137 107 15 24 42 54 82 84 49 60 50 14 2 4 2 3 2 1 1 1 1 1 1 1 0 0 0 0 0
129 158 201 246 274 93 13 27 62 65 61 98 135 127 149 44 12 5 2 1 1 2 0 0 0 0 0 0 0 0 2 4 9 8 8
169 474 558 664 570 119 31 43 78 75 148 276 208 165 238 190 25 3 1 4 4 2 0 0 0 0 0 6 7 22 37 38 45
196 554 868 1292 852 213 102 43 89 79 134 159 107 140 183 67 6 1 1 0 1 1 2 1 16 1 0 0 0 2 17 22 31 43 35 60
118 287 558 787 511 256 172 60 12 46 50 97 162 206 158 18 2 3 3 1 2 2 3 15 42 11 2 1 6 7 14 13 16 18 34
54 82 108 150 228 270 315 378 115 26 16 50 139 162 187 35 29 17 5 1 1 1 23 33 18 14 4 1 1 1 2 12 11 9 7 9
84 223 444 520 723 796 364 986 710 50 18 35 43 68 349 122 133 99 51 2 1 6 115 77 26 19 13 16 14 10 7 4 3 7 3 6
196 299 502 651 863 1099 802 1407 1209 336 5 9 10 27 367 184 117 134 88 6 2 9 19 110 87 69 54 90 80 36 5 2 12 32 23 33
247 267 347 385 329 334 450 581 625 406 95 5 9 94 238 234 56 55 64 11 1 33 32 59 64 66 73 114 130 35 0 1 0 22 39 109
245 286 342 421 522 569 574 329 376 319 150 13 92 303 326 265 34 21 24 19 18 33 35 34 41 35 32 49 95 68 56 45 9 28 52 115
65 97 107 112 140 211 336 283 249 212 116 26 118 185 171 74 25 18 16 17 15 17 16 14 17 19 21 13 10 24 26 28 23 23 17 14
1 2 4 3 3 2 2 3 4 7 5 4 3 1 0 0

Figure 11. SATOB 701 - 1000 hPa vector mean wind. SEPTEMBER 2002
All observations
Arrows are plotted where greater than 10 obs are present

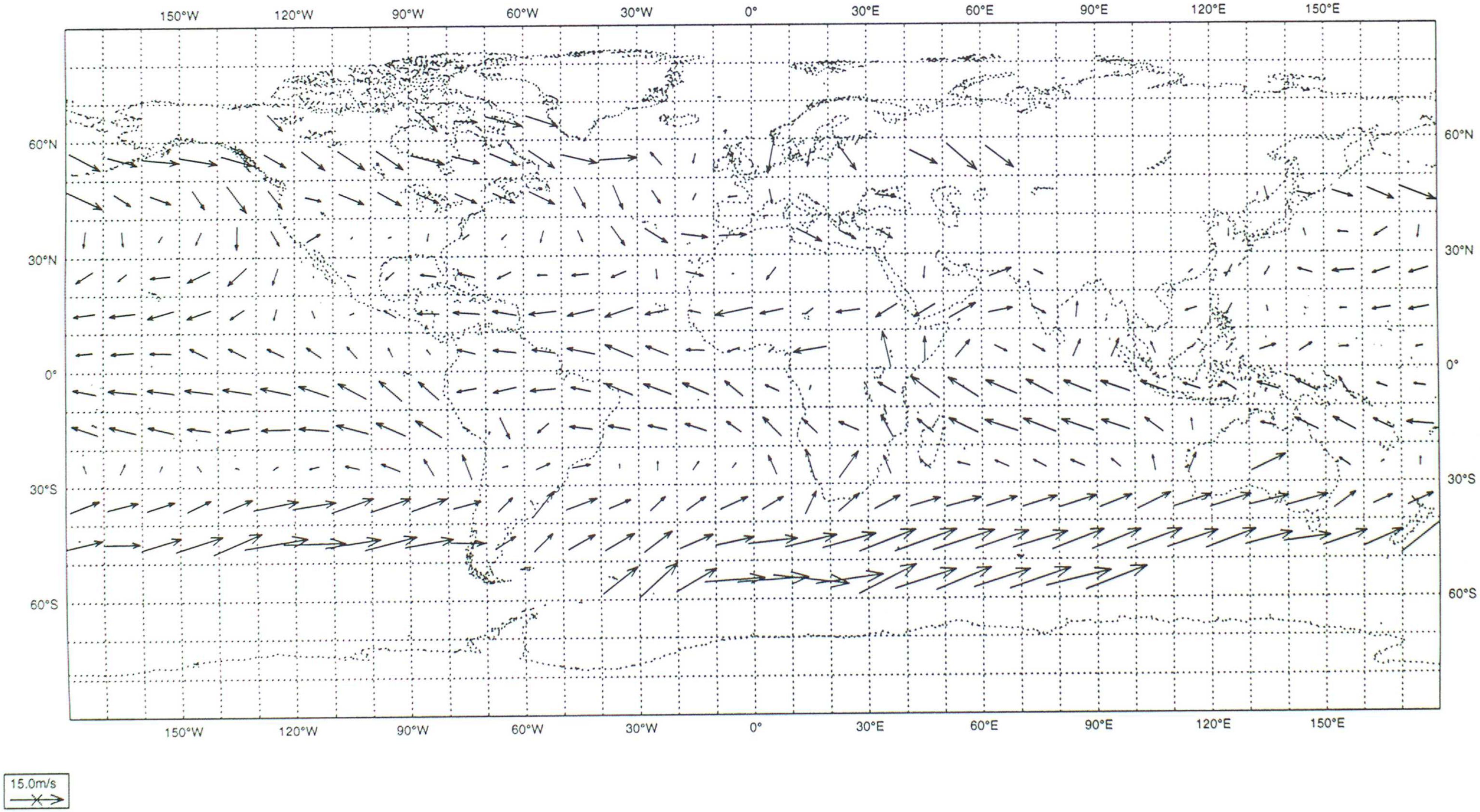

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa vector wind differences. SEPTEMBER 2002
All observations
Arrows are plotted where greater than 10 obs are present

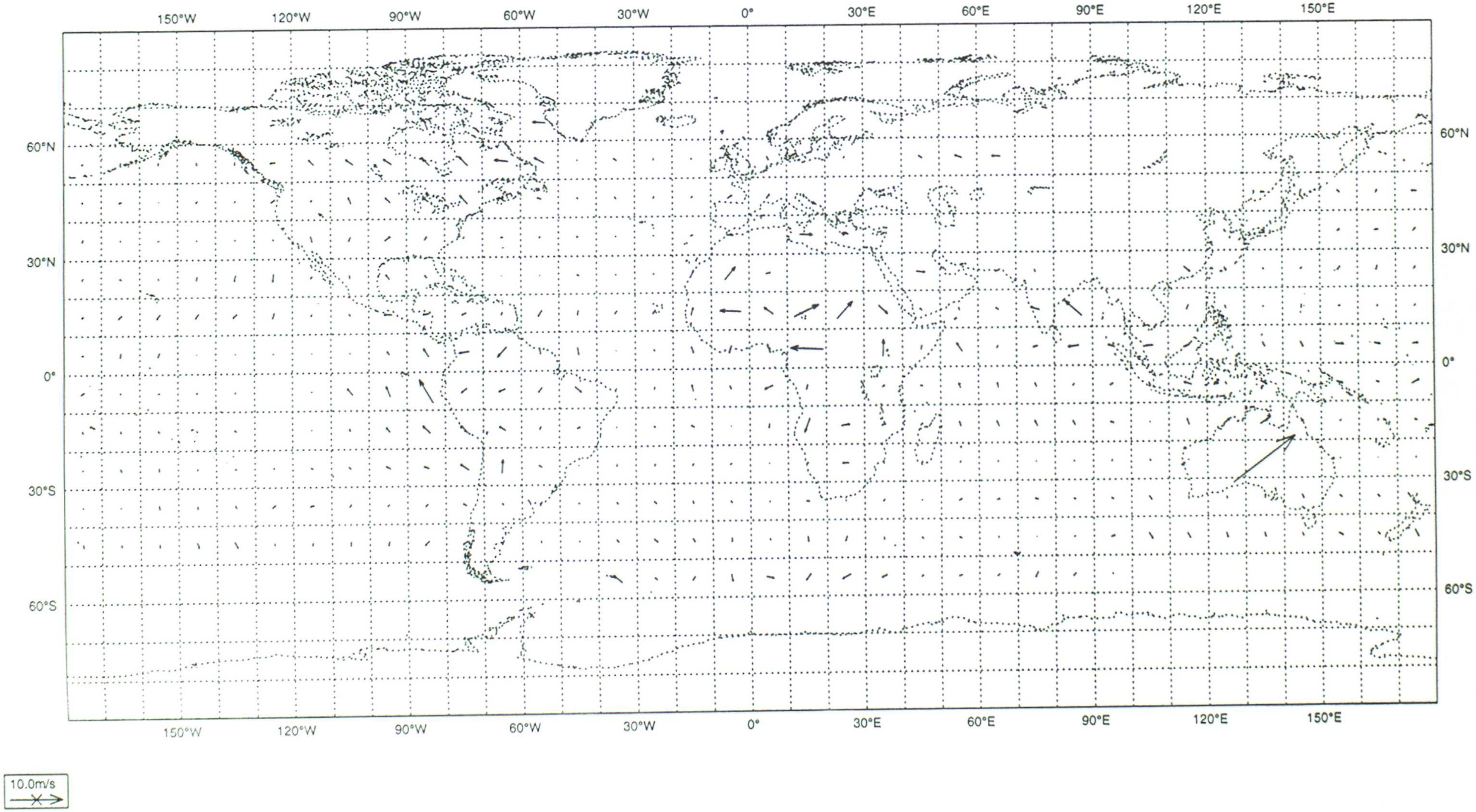

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). SEPTEMBER 2002
All observations
Values are plotted where greater than 10 obs are present

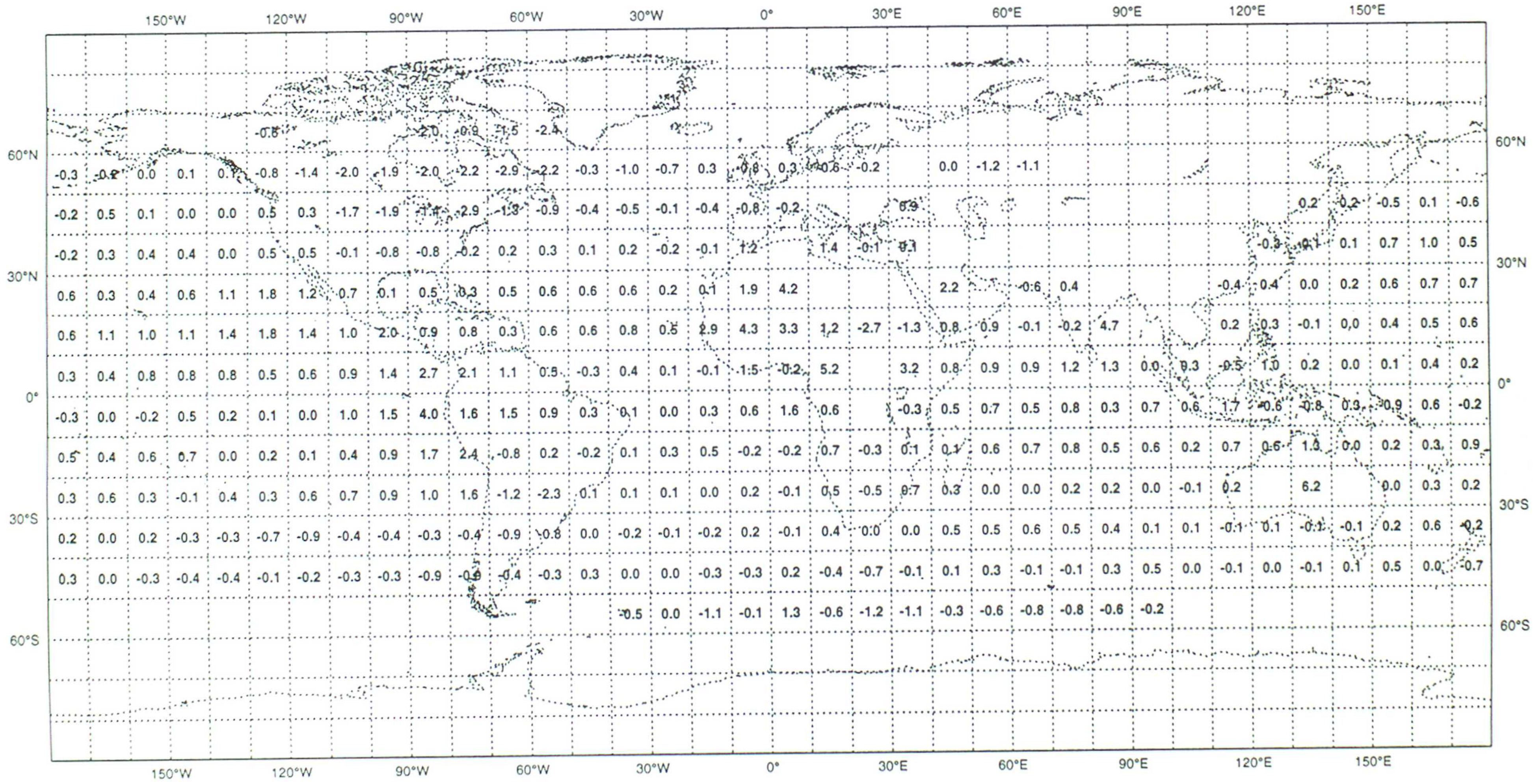

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.8 -2.0 -0.9 -1.5 -2.4
-0.3 -0.2 0.0 0.1 0.1 -0.8 -1.4 -2.0 -1.9 -2.0 -2.2 -2.9 -2.2 -0.3 -1.0 -0.7 0.3 -0.8 0.3 -0.6 -0.2 0.0 -1.2 -1.1
-0.2 0.5 0.1 0.0 0.0 0.5 0.3 -1.7 -1.9 -1.4 -2.9 -1.3 -0.9 -0.4 -0.5 -0.1 -0.4 -0.8 -0.2 0.9 0.2 -0.2 -0.5 0.1 -0.6
-0.2 0.3 0.4 0.4 0.0 0.5 0.5 -0.1 -0.8 -0.8 -0.2 0.2 0.3 0.1 0.2 -0.2 -0.1 1.2 1.4 -0.1 0.1 -0.3 -0.1 0.1 0.7 1.0 0.5
0.6 0.3 0.4 0.6 1.1 1.8 1.2 0.7 0.1 0.5 0.3 0.5 0.6 0.6 0.6 0.2 0.1 1.9 4.2 2.2 -0.6 0.4 -0.4 0.4 0.0 0.2 0.6 0.7 0.7
0.6 1.1 1.0 1.1 1.4 1.8 1.4 1.0 2.0 0.9 0.8 0.3 0.6 0.6 0.8 0.5 2.9 4.3 3.3 1.2 -2.7 -1.3 0.8 0.9 -0.1 -0.2 4.7 0.2 0.3 -0.1 0.0 0.4 0.5 0.6
0.3 0.4 0.8 0.8 0.8 0.5 0.6 0.9 1.4 2.7 2.1 1.1 0.5 -0.3 0.4 0.1 -0.1 -1.5 -0.2 5.2 3.2 0.8 0.9 0.9 1.2 1.3 0.0 0.3 -0.5 1.0 0.2 0.0 0.1 0.4 0.2
-0.3 0.0 -0.2 0.5 0.2 0.1 0.0 1.0 1.5 4.0 1.6 1.5 0.9 0.3 0.1 0.0 0.3 0.6 1.6 0.6 -0.3 0.5 0.7 0.5 0.8 0.3 0.7 0.6 1.7 -0.6 -0.8 0.3 -0.9 0.6 -0.2
0.5 0.4 0.6 0.7 0.0 0.2 0.1 0.4 0.9 1.7 2.4 -0.8 0.2 -0.2 0.1 0.3 0.5 -0.2 -0.2 0.7 -0.3 0.1 0.1 0.6 0.7 0.8 0.5 0.6 0.2 0.7 0.6 1.3 0.0 0.2 0.3 0.9
0.3 0.6 0.3 -0.1 0.4 0.3 0.6 0.7 0.9 1.0 1.6 -1.2 -2.3 0.1 0.1 0.1 0.0 0.2 -0.1 0.5 -0.5 0.7 0.3 0.0 0.0 0.2 0.2 0.0 -0.1 0.2 6.2 0.0 0.3 0.2
0.2 0.0 0.2 -0.3 -0.3 -0.7 -0.9 -0.4 -0.4 -0.3 -0.4 -0.9 -0.8 0.0 -0.2 -0.1 -0.2 0.2 -0.1 0.4 0.0 0.0 0.5 0.5 0.6 0.5 0.4 0.1 0.1 -0.1 0.1 -0.1 -0.1 0.2 0.6 -0.2
0.3 0.0 -0.3 -0.4 -0.4 -0.1 -0.2 -0.3 -0.3 -0.9 -0.9 -0.4 -0.3 0.3 0.0 0.0 -0.3 -0.3 0.2 -0.4 -0.7 -0.1 0.1 0.3 -0.1 -0.1 0.3 0.5 0.0 -0.1 0.0 -0.1 0.1 0.5 0.0 -0.7
-0.5 0.0 -1.1 -0.1 1.3 -0.6 -1.2 -1.1 -0.3 -0.6 -0.8 -0.8 -0.6 -0.2

Figure 14. SATOB 701 - 1000 hPa RMS O-B vector differences (ms-1). SEPTEMBER 2002
All observations
Values are plotted where greater than 10 obs are present

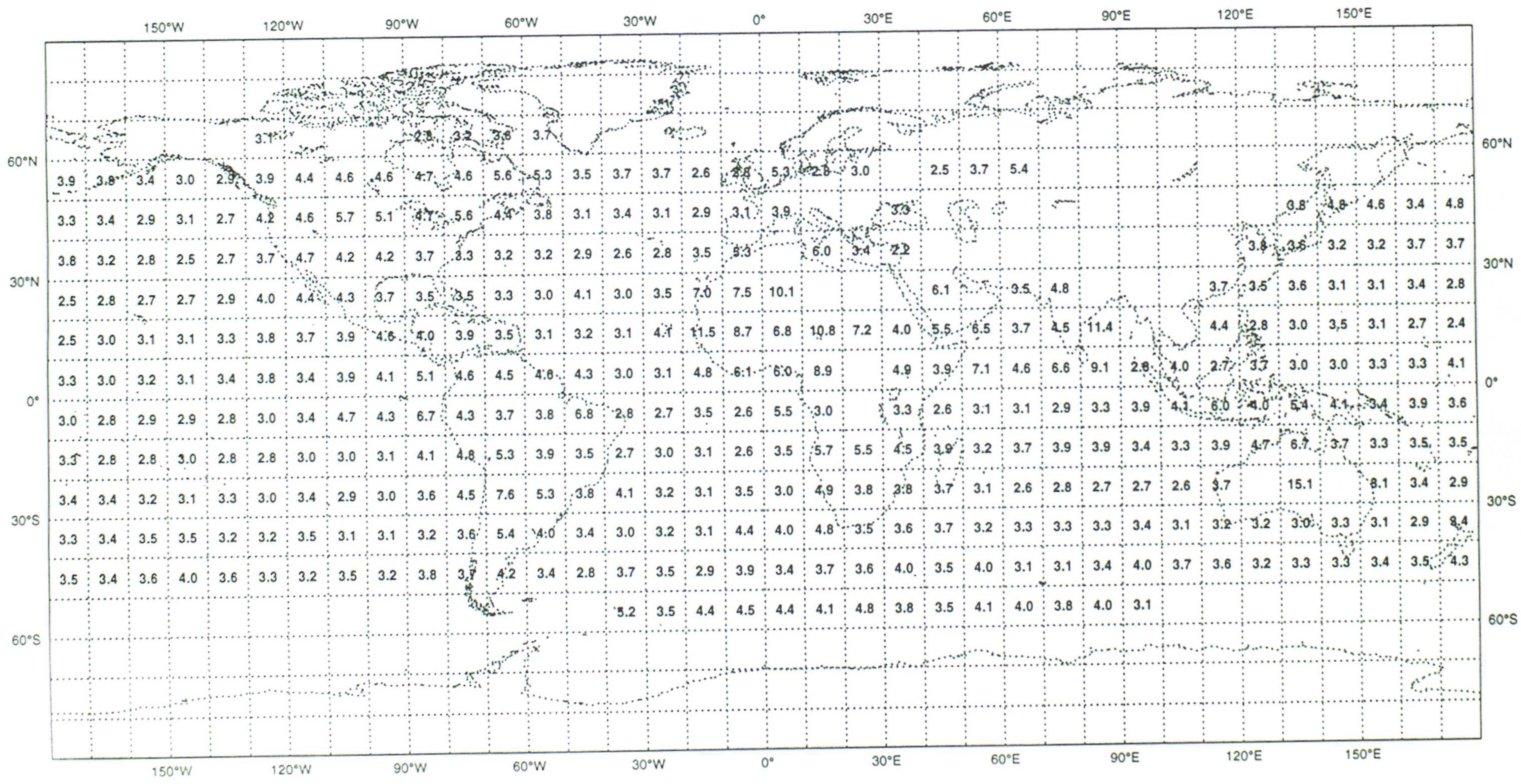

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
3.1 2.8 3.2 3.8 3.7
3.9 3.8 3.4 3.0 2.9 3.9 4.4 4.6 4.6 4.7 4.6 5.6 5.3 3.5 3.7 3.7 2.6 2.8 5.3 2.8 3.0 2.5 3.7 5.4
3.3 3.4 2.9 3.1 2.7 4.2 4.6 5.7 5.1 4.7 5.6 4.4 3.8 3.1 3.4 3.1 2.9 3.1 3.9 3.3 3.8 4.8 4.6 3.4 4.8
3.8 3.2 2.8 2.5 2.7 3.7 4.7 4.2 4.2 3.7 3.3 3.2 3.2 2.9 2.6 2.8 3.5 3.3 6.0 3.4 2.2 3.8 3.6 3.2 3.2 3.7 3.7
2.5 2.8 2.7 2.7 2.9 4.0 4.4 4.3 3.7 3.5 3.5 3.3 3.0 4.1 3.0 3.5 7.0 7.5 10.1 6.1 3.5 4.8 3.7 3.5 3.6 3.1 3.1 3.4 2.8
2.5 3.0 3.1 3.1 3.3 3.8 3.7 3.9 4.6 4.0 3.9 3.5 3.1 3.2 3.1 4.1 11.5 8.7 6.8 10.8 7.2 4.0 5.5 6.5 3.7 4.5 11.4 4.4 2.8 3.0 3.5 3.1 2.7 2.4
3.3 3.0 3.2 3.1 3.4 3.8 3.4 3.9 4.1 5.1 4.6 4.5 4.8 4.3 3.0 3.1 4.8 6.1 6.0 8.9 4.9 3.9 7.1 4.6 6.6 9.1 2.8 4.0 2.7 3.7 3.0 3.0 3.3 3.3 4.1
3.0 2.8 2.9 2.9 2.8 3.0 3.4 4.7 4.3 6.7 4.3 3.7 3.8 6.8 2.8 2.7 3.5 2.6 5.5 3.0 3.3 2.6 3.1 3.1 2.9 3.3 3.9 4.1 6.0 4.0 5.4 4.1 3.4 3.9 3.6
3.3 2.8 2.8 3.0 2.8 2.8 3.0 3.0 3.1 4.1 4.8 5.3 3.9 3.5 2.7 3.0 3.1 2.6 3.5 5.7 5.5 4.5 3.9 3.2 3.7 3.9 3.9 3.4 3.3 3.9 4.7 6.7 3.7 3.3 3.5 3.5
3.4 3.4 3.2 3.1 3.3 3.0 3.4 2.9 3.0 3.6 4.5 7.6 5.3 3.8 4.1 3.2 3.1 3.5 3.0 4.9 3.8 3.8 3.7 3.1 2.6 2.8 2.7 2.7 2.6 3.7 15.1 8.1 3.4 2.9
3.3 3.4 3.5 3.5 3.2 3.2 3.5 3.1 3.1 3.2 3.6 5.4 4.0 3.4 3.0 3.2 3.1 4.4 4.0 4.8 3.5 3.6 3.7 3.2 3.3 3.3 3.3 3.4 3.1 3.2 3.2 3.0 3.3 3.1 2.9 3.4
3.5 3.4 3.6 4.0 3.6 3.3 3.2 3.5 3.2 3.8 3.7 4.2 3.4 2.8 3.7 3.5 2.9 3.9 3.4 3.7 3.6 4.0 3.5 4.0 3.1 3.1 3.4 4.0 3.7 3.6 3.2 3.3 3.3 3.4 3.5 4.3
5.2 3.5 4.4 4.5 4.4 4.1 4.8 3.8 3.5 4.1 4.0 3.8 4.0 3.1

Figure 15. SATOB 401 - 700 hPa mean daily count. SEPTEMBER 2002
Global average number of observations in 24 hours = 13181

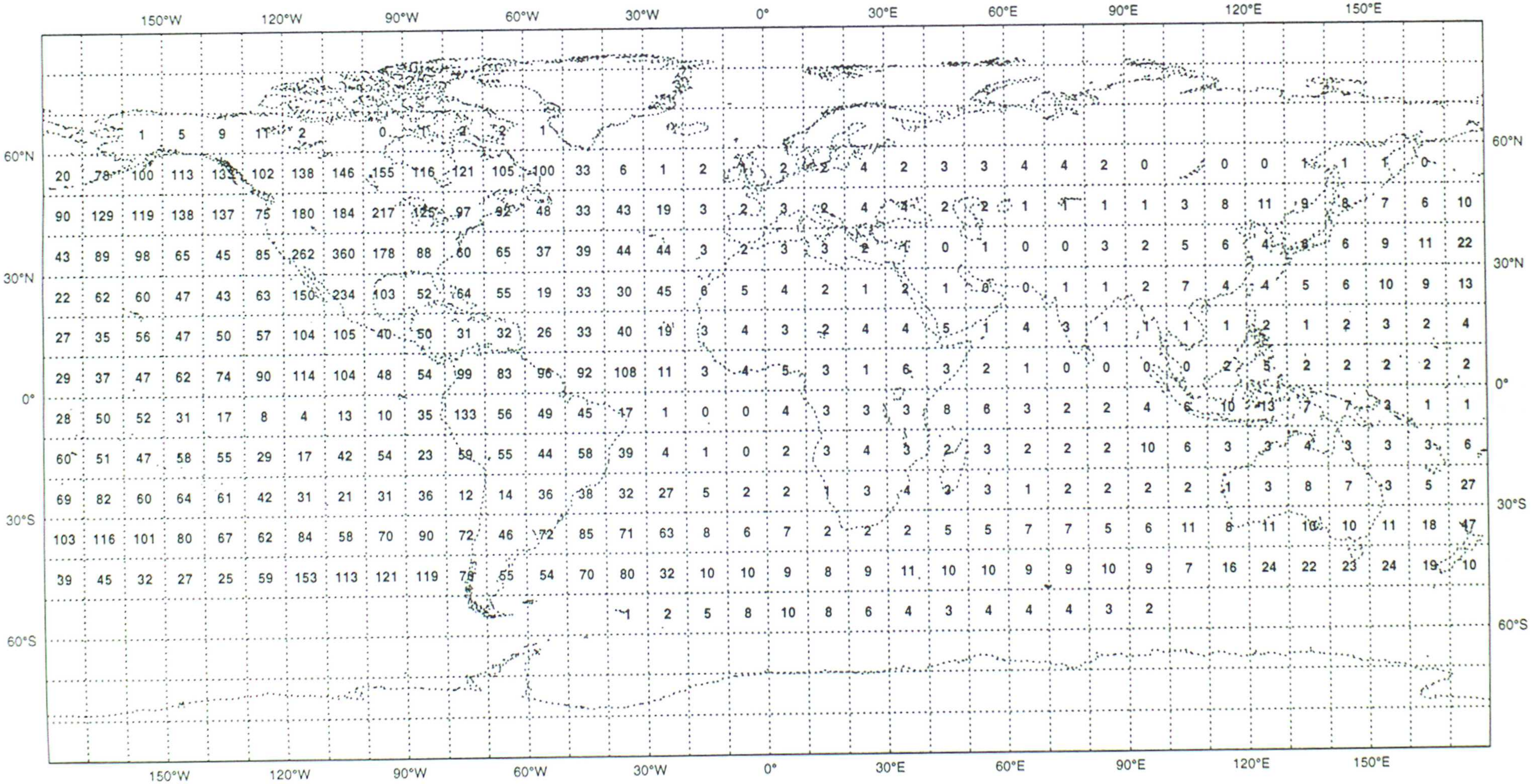

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 5 9 11 2 0 1 2 2 1
20 78 100 113 133 102 138 146 155 116 121 105 100 33 6 1 2 1 2 2 4 2 3 3 4 4 2 0 0 0 1 1 1 0
90 129 119 138 137 75 180 184 217 125 97 92 48 33 43 19 3 2 3 2 4 4 2 2 1 1 1 1 3 8 11 9 8 7 6 10
43 89 98 65 45 85 262 360 178 88 60 65 37 39 44 44 3 2 3 3 2 1 0 1 0 0 3 2 5 6 4 8 6 9 11 22
22 62 60 47 43 63 150 234 103 52 64 55 19 33 30 45 6 5 4 2 1 2 1 0 0 1 1 2 7 4 4 5 6 10 9 13
27 35 56 47 50 57 104 105 40 50 31 32 26 33 40 19 3 4 3 2 4 4 5 1 4 3 1 1 1 1 2 1 2 3 2 4
29 37 47 62 74 90 114 104 48 54 99 83 96 92 108 11 3 4 5 3 1 6 3 2 1 0 0 0 0 2 5 2 2 2 2 2
28 50 52 31 17 8 4 13 10 35 133 56 49 45 17 1 0 0 4 3 3 3 8 6 3 2 2 4 6 10 13 7 7 3 1 1
60 51 47 58 55 29 17 42 54 23 59 55 44 58 39 4 1 0 2 3 4 3 2 3 2 2 2 10 6 3 3 4 3 3 3 6
69 82 60 64 61 42 31 21 31 36 12 14 36 38 32 27 5 2 2 1 3 4 3 3 1 2 2 2 2 1 3 8 7 3 5 27
103 116 101 80 67 62 84 58 70 90 72 46 72 85 71 63 8 6 7 2 2 2 5 5 7 7 5 6 11 8 11 10 10 11 18 47
39 45 32 27 25 59 153 113 121 119 78 55 54 70 80 32 10 10 9 8 9 11 10 10 9 9 10 9 7 16 24 22 23 24 19 10
1 2 5 8 10 8 6 4 3 4 4 4 3 2

Figure 16. SATOB 401 - 700 hPa vector mean wind. SEPTEMBER 2002
All observations
Arrows are plotted where greater than 10 obs are present

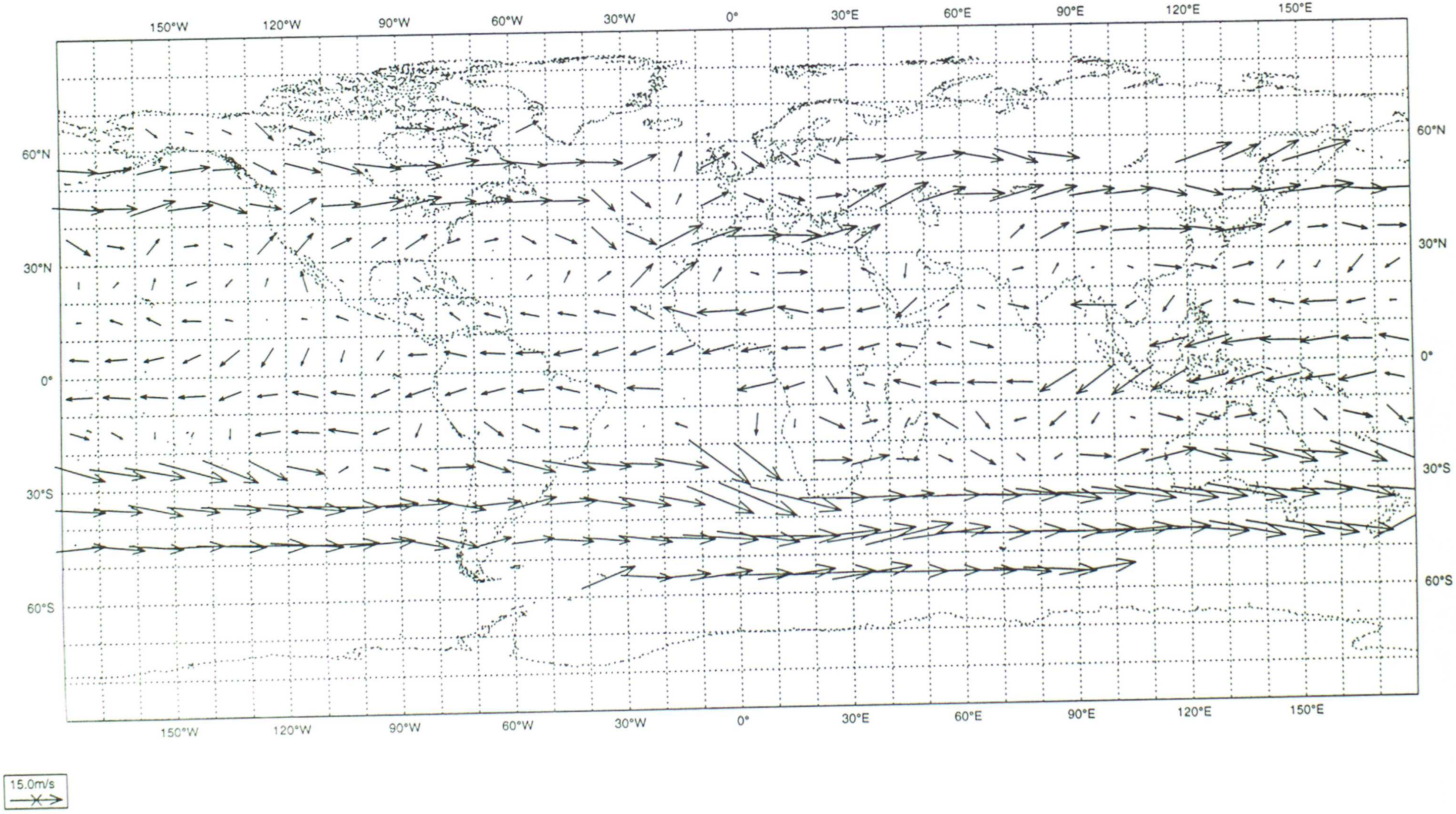
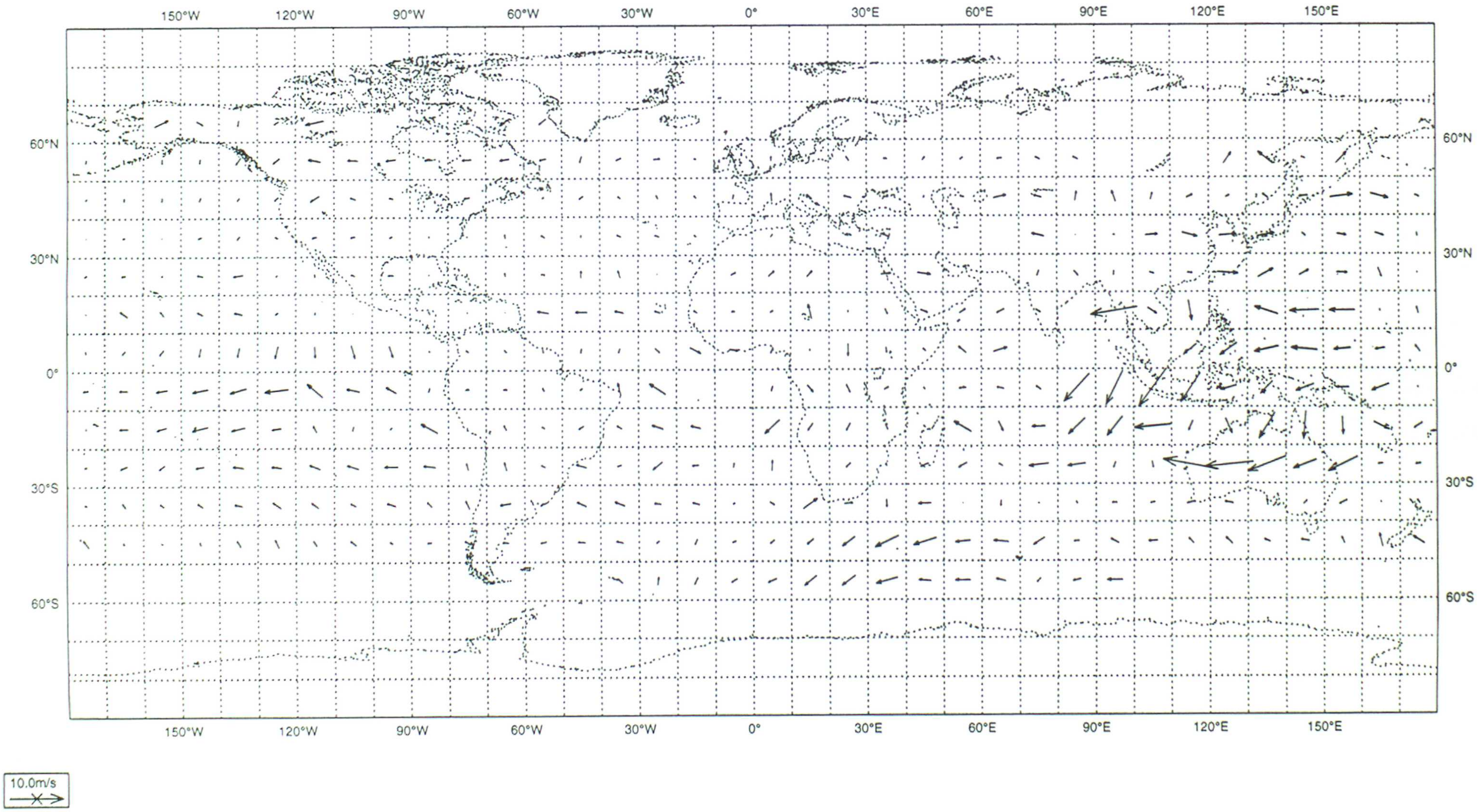

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa vector wind differences. SEPTEMBER 2002
All observations
Arrows are plotted where greater than 10 obs are present



150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). SEPTEMBER 2002
All observations
Values are plotted where greater than 10 obs are present

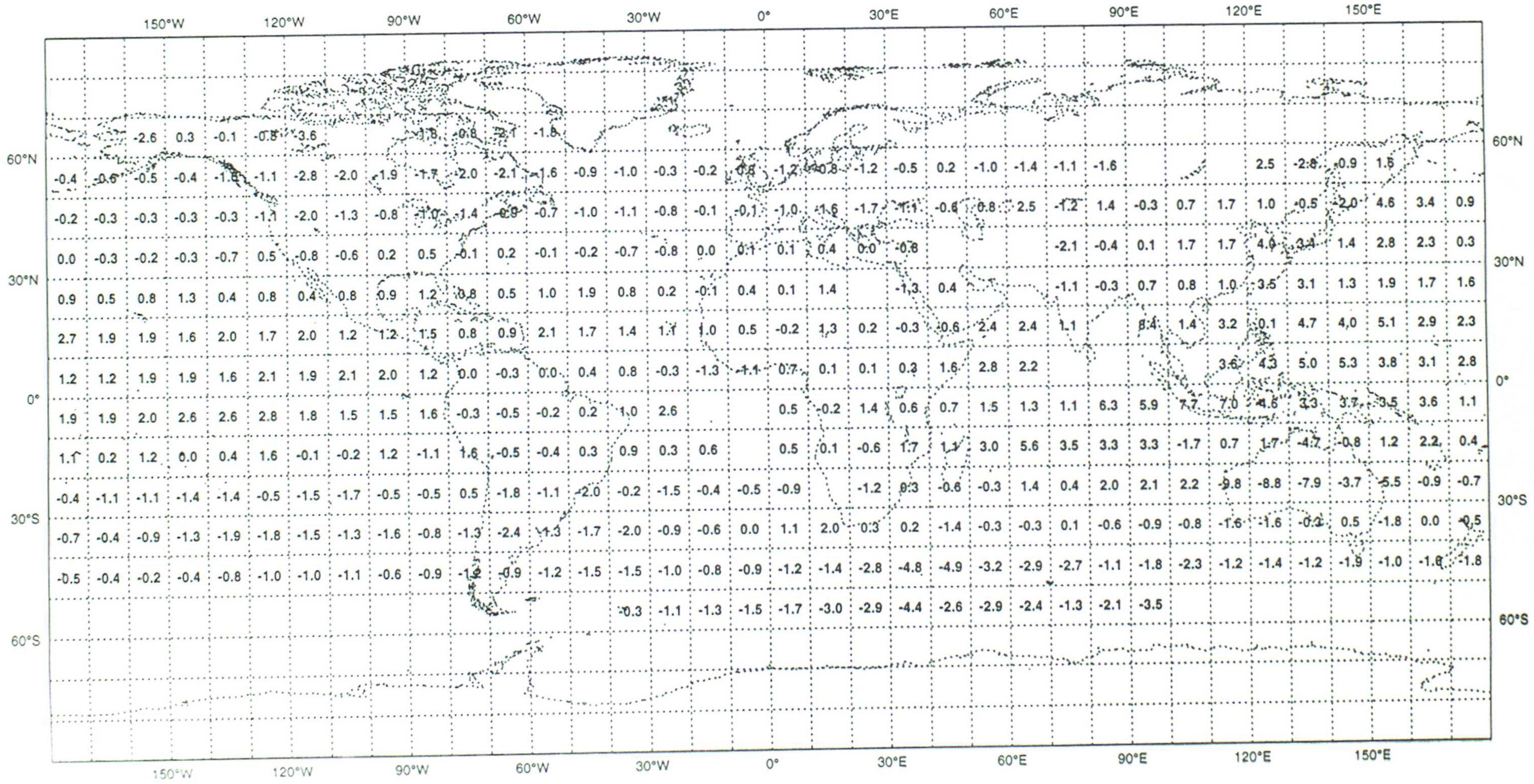

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-2.6 0.3 -0.1 -0.8 -3.6 -1.8 -0.8 -2.1 -1.8
-0.4 -0.6 -0.5 -0.4 -1.8 -1.1 -2.8 -2.0 -1.9 -1.7 -2.0 -2.1 -1.6 -0.9 -1.0 -0.3 -0.2 0.8 -1.2 -0.8 -1.2 -0.5 0.2 -1.0 -1.4 -1.1 -1.6 2.5 -2.8 -0.9 1.6
-0.2 -0.3 -0.3 -0.3 -0.3 -1.1 -2.0 -1.3 -0.8 -1.0 -1.4 -0.9 -0.7 -1.0 -1.1 -0.8 -0.1 -0.1 -1.0 -1.6 -1.7 -1.1 -0.6 0.8 2.5 -1.2 1.4 -0.3 0.7 1.7 1.0 -0.5 -2.0 4.6 3.4 0.9
0.0 -0.3 -0.2 -0.3 -0.7 0.5 -0.8 -0.6 0.2 0.5 -0.1 0.2 -0.1 -0.2 -0.7 -0.8 0.0 0.1 0.1 0.4 0.0 -0.8 -2.1 -0.4 0.1 1.7 1.7 4.0 3.4 1.4 2.8 2.3 0.3
0.9 0.5 0.8 1.3 0.4 0.8 0.4 0.8 0.9 1.2 0.8 0.5 1.0 1.9 0.8 0.2 -0.1 0.4 0.1 1.4 -1.3 0.4 -1.1 -0.3 0.7 0.8 1.0 3.5 3.1 1.3 1.9 1.7 1.6
2.7 1.9 1.9 1.6 2.0 1.7 2.0 1.2 1.2 1.5 0.8 0.9 2.1 1.7 1.4 1.1 1.0 0.5 -0.2 1.3 0.2 -0.3 -0.6 2.4 2.4 1.1 8.4 1.4 3.2 0.1 4.7 4.0 5.1 2.9 2.3
1.2 1.2 1.9 1.9 1.6 2.1 1.9 2.1 2.0 1.2 0.0 -0.3 0.0 0.4 0.8 -0.3 -1.3 -1.1 0.7 0.1 0.1 0.3 1.6 2.8 2.2 3.6 4.3 5.0 5.3 3.8 3.1 2.8
1.9 1.9 2.0 2.6 2.6 2.8 1.8 1.5 1.5 1.6 -0.3 -0.5 -0.2 0.2 1.0 2.6 0.5 -0.2 1.4 0.6 0.7 1.5 1.3 1.1 6.3 5.9 7.7 7.0 4.6 3.3 3.7 3.5 3.6 1.1
1.1 0.2 1.2 0.0 0.4 1.6 -0.1 -0.2 1.2 -1.1 1.6 -0.5 -0.4 0.3 0.9 0.3 0.6 0.5 0.1 -0.6 1.7 1.1 3.0 5.6 3.5 3.3 3.3 -1.7 0.7 1.7 -4.7 -0.8 1.2 2.2 0.4
-0.4 -1.1 -1.1 -1.4 -1.4 -0.5 -1.5 -1.7 -0.5 -0.5 0.5 -1.8 -1.1 -2.0 -0.2 -1.5 -0.4 -0.5 -0.9 -1.2 0.3 -0.6 -0.3 1.4 0.4 2.0 2.1 2.2 -9.8 -8.8 -7.9 -3.7 -5.5 -0.9 -0.7
-0.7 -0.4 -0.9 -1.3 -1.9 -1.8 -1.5 -1.3 -1.6 -0.8 -1.3 -2.4 -1.3 -1.7 -2.0 -0.9 -0.6 0.0 1.1 2.0 0.3 0.2 -1.4 -0.3 -0.3 0.1 -0.6 -0.9 -0.8 -1.6 -1.6 -0.2 0.5 -1.8 0.0 -0.5
-0.5 -0.4 -0.2 -0.4 -0.8 -1.0 -1.0 -1.1 -0.6 -0.9 -1.2 -0.9 -1.2 -1.5 -1.5 -1.0 -0.8 -0.9 -1.2 -1.4 -2.8 -4.8 -4.9 -3.2 -2.9 -2.7 -1.1 -1.8 -2.3 -1.2 -1.4 -1.2 -1.9 -1.0 -1.6 -1.8
-0.3 -1.1 -1.3 -1.5 -1.7 -3.0 -2.9 -4.4 -2.6 -2.9 -2.4 -1.3 -2.1 -3.5

Figure 19. SATOB 401 - 700 hPa RMS O-B vector differences (ms-1). SEPTEMBER 2002
All observations
Values are plotted where greater than 10 obs are present

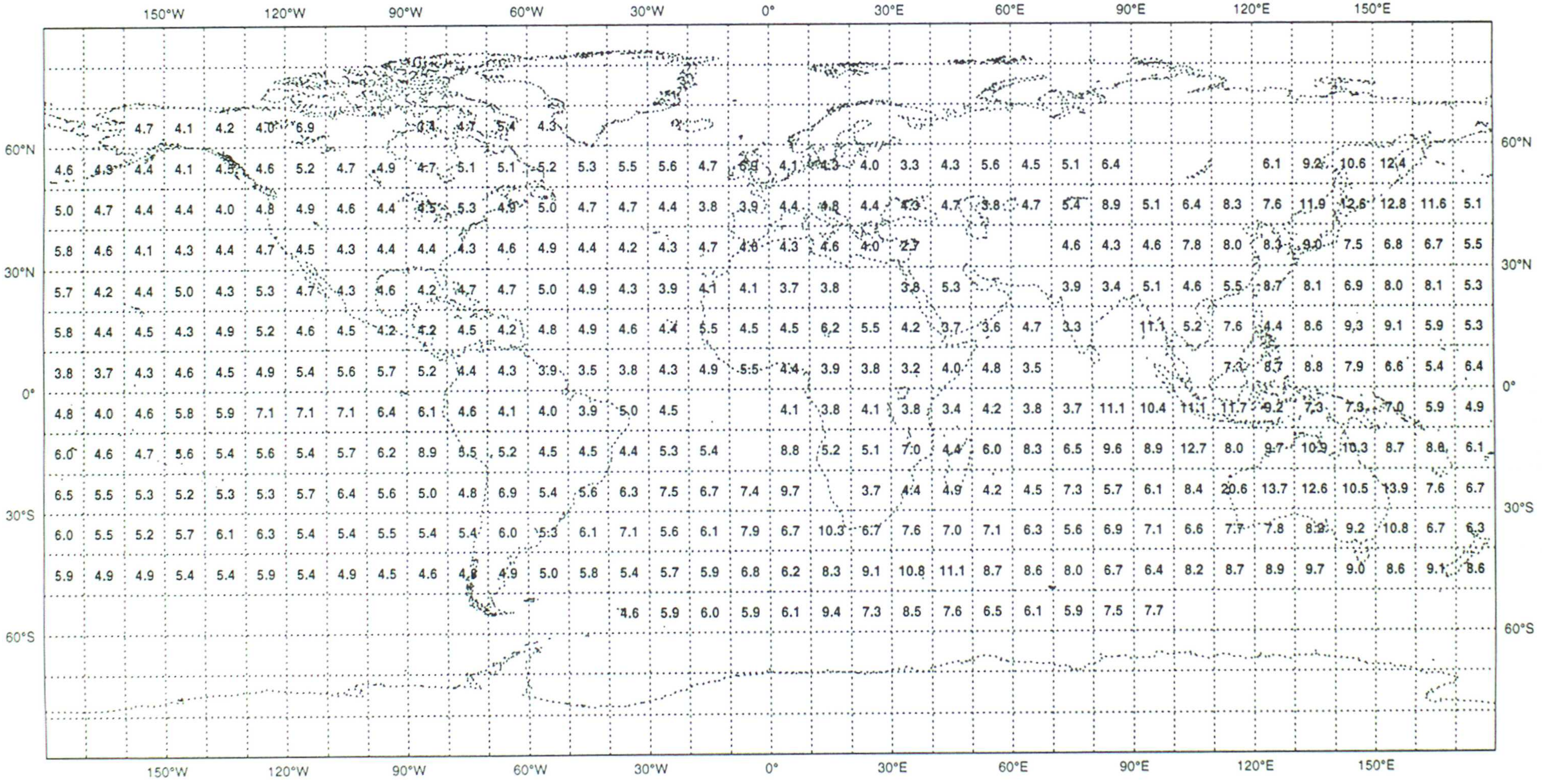

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.7 4.1 4.2 4.0 6.9 6.4 4.7 5.4 4.3
4.6 4.9 4.4 4.1 4.5 4.6 5.2 4.7 4.9 4.7 5.1 5.1 5.2 5.3 5.5 5.6 4.7 6.9 4.1 4.3 4.0 3.3 4.3 5.6 4.5 5.1 6.4 6.1 9.2 10.6 12.4
5.0 4.7 4.4 4.4 4.0 4.8 4.9 4.6 4.4 4.5 5.3 4.9 5.0 4.7 4.7 4.4 3.8 3.9 4.4 4.8 4.4 4.3 4.7 3.8 4.7 5.4 8.9 5.1 6.4 8.3 7.6 11.9 12.6 12.8 11.6 5.1
5.8 4.6 4.1 4.3 4.4 4.7 4.5 4.3 4.4 4.4 4.3 4.6 4.9 4.4 4.2 4.3 4.7 4.6 4.3 4.6 4.0 2.7 4.6 4.3 4.6 7.8 8.0 8.3 9.0 7.5 6.8 6.7 5.5
5.7 4.2 4.4 5.0 4.3 5.3 4.7 4.3 4.6 4.2 4.7 4.7 5.0 4.9 4.3 3.9 4.1 4.1 3.7 3.8 3.8 5.3 3.9 3.4 5.1 4.6 5.5 8.7 8.1 6.9 8.0 8.1 5.3
5.8 4.4 4.5 4.3 4.9 5.2 4.6 4.5 4.2 4.2 4.5 4.2 4.8 4.9 4.6 4.4 5.5 4.5 4.5 6.2 5.5 4.2 3.7 3.6 4.7 3.3 11.1 5.2 7.6 4.4 8.6 9.3 9.1 5.9 5.3
3.8 3.7 4.3 4.6 4.5 4.9 5.4 5.6 5.7 5.2 4.4 4.3 3.9 3.5 3.8 4.3 4.9 5.5 4.4 3.9 3.8 3.2 4.0 4.8 3.5 7.3 8.7 8.8 7.9 6.6 5.4 6.4
4.8 4.0 4.6 5.8 5.9 7.1 7.1 7.1 6.4 6.1 4.6 4.1 4.0 3.9 5.0 4.5 4.1 3.8 4.1 3.8 3.4 4.2 3.8 3.7 11.1 10.4 11.1 11.7 9.2 7.3 7.3 7.0 5.9 4.9
6.0 4.6 4.7 5.6 5.4 5.6 5.4 5.7 6.2 8.9 5.5 5.2 4.5 4.5 4.4 5.3 5.4 8.8 5.2 5.1 7.0 4.4 6.0 8.3 6.5 9.6 8.9 12.7 8.0 9.7 10.9 10.3 8.7 8.8 6.1
6.5 5.5 5.3 5.2 5.3 5.3 5.7 6.4 5.6 5.0 4.8 6.9 5.4 5.6 6.3 7.5 6.7 7.4 9.7 3.7 4.4 4.9 4.2 4.5 7.3 5.7 6.1 8.4 20.6 13.7 12.6 10.5 13.9 7.6 6.7
6.0 5.5 5.2 5.7 6.1 6.3 5.4 5.4 5.5 5.4 5.4 6.0 5.3 6.1 7.1 5.6 6.1 7.9 6.7 10.3 6.7 7.6 7.0 7.1 6.3 5.6 6.9 7.1 6.6 7.7 7.8 8.2 9.2 10.8 6.7 6.3
5.9 4.9 4.9 5.4 5.4 5.9 5.4 4.9 4.5 4.6 4.8 4.9 5.0 5.8 5.4 5.7 5.9 6.8 6.2 8.3 9.1 10.8 11.1 8.7 8.6 8.0 6.7 6.4 8.2 8.7 8.9 9.7 9.0 8.6 9.1 8.6
4.6 5.9 6.0 5.9 6.1 9.4 7.3 8.5 7.6 6.5 6.1 5.9 7.5 7.7

Figure 20. SATOB 101 - 400 hPa mean daily count. SEPTEMBER 2002
Global average number of observations in 24 hours = 66307

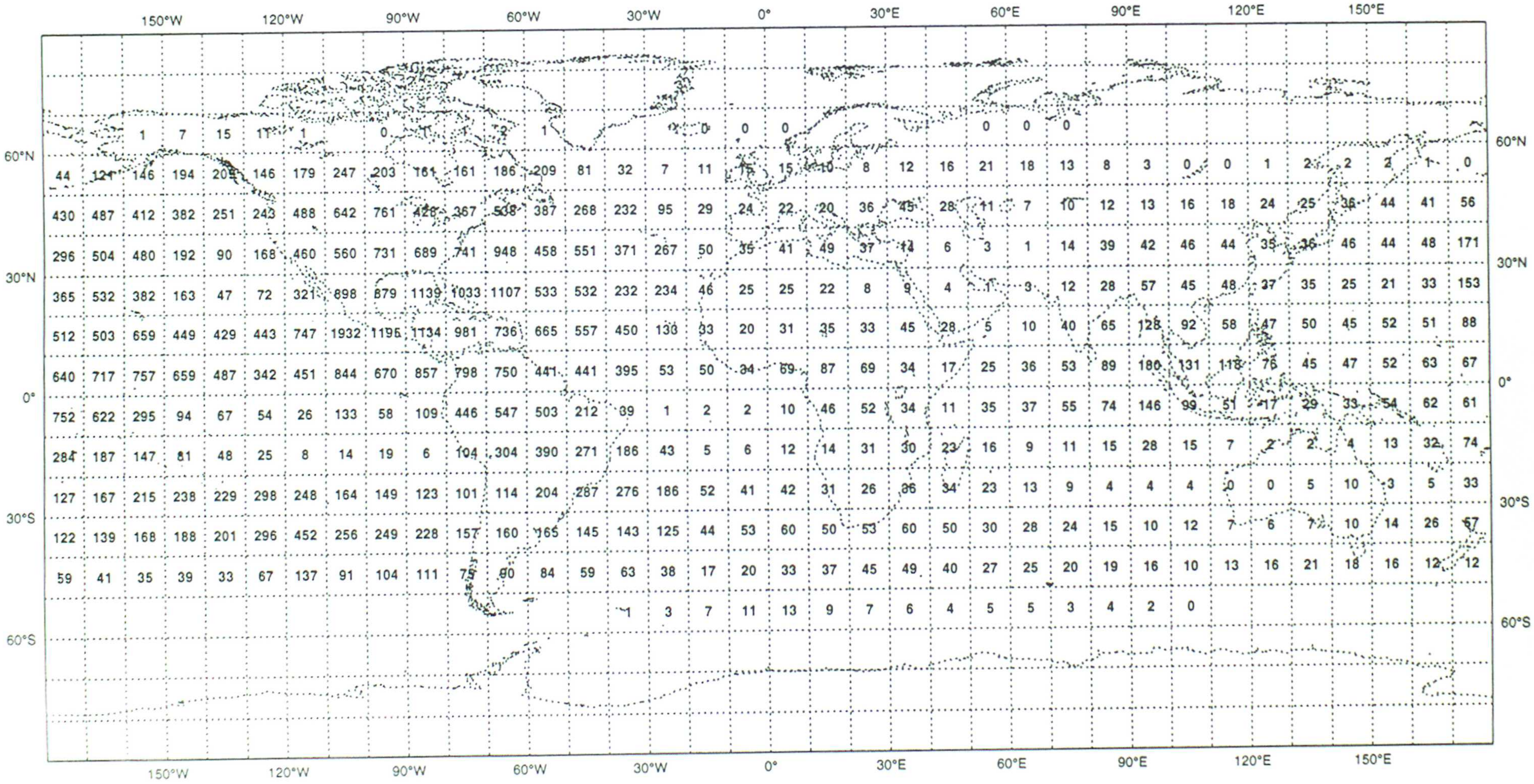

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 7 15 11 1 0 1 2 1 0 0 0 0 0 0
44 124 146 194 208 146 179 247 203 161 161 186 209 81 32 7 11 15 15 10 8 12 16 21 18 13 8 3 0 0 1 2 2 2 1 0
430 487 412 382 251 243 488 642 761 428 367 508 387 268 232 95 29 24 22 20 36 45 28 11 7 10 12 13 16 18 24 25 36 44 41 56
296 504 480 192 90 168 460 560 731 689 741 948 458 551 371 267 50 35 41 49 37 14 6 3 1 14 39 42 46 44 35 36 46 44 48 171
365 532 382 163 47 72 321 898 879 1139 1033 1107 533 532 232 234 46 25 25 22 8 9 4 1 3 12 28 57 45 48 37 35 25 21 33 153
512 503 659 449 429 443 747 1932 1195 1134 981 736 665 557 450 130 33 20 31 35 33 45 28 5 10 40 65 128 92 58 47 50 45 52 51 88
640 717 757 659 487 342 451 844 670 857 798 750 441 441 395 53 50 34 69 87 69 34 17 25 36 53 89 180 131 118 76 45 47 52 63 67
752 622 295 94 67 54 26 133 58 109 446 547 503 212 39 1 2 2 10 46 52 34 11 35 37 55 74 146 99 51 17 29 33 54 62 61
284 187 147 81 48 25 8 14 19 6 104 304 390 271 186 43 5 6 12 14 31 30 23 16 9 11 15 28 15 7 2 2 4 13 32 74
127 167 215 238 229 298 248 164 149 123 101 114 204 287 276 186 52 41 42 31 26 36 34 23 13 9 4 4 4 0 0 5 10 3 5 33
122 139 168 188 201 296 452 256 249 228 157 160 165 145 143 125 44 53 60 50 53 60 50 30 28 24 15 10 12 7 6 7 10 14 26 57
59 41 35 39 33 67 137 91 104 111 75 90 84 59 63 38 17 20 33 37 45 49 40 27 25 20 19 16 10 13 16 21 18 16 12 12
1 3 7 11 13 9 7 6 4 5 5 3 4 2 0

Figure 21. SATOB 101 - 400 hPa vector mean wind. SEPTEMBER 2002
All observations
Arrows are plotted where greater than 10 obs are present

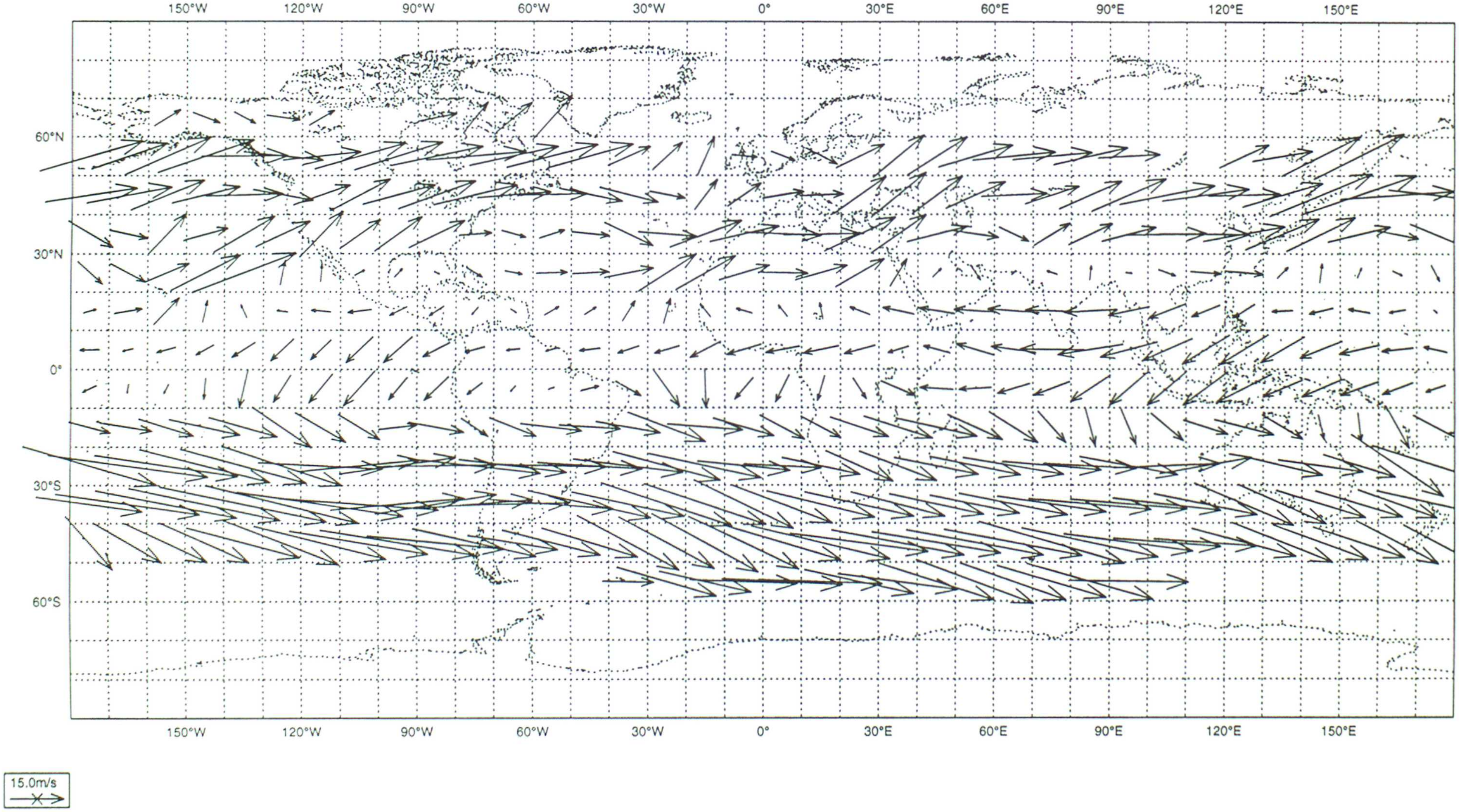

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa vector wind differences. SEPTEMBER 2002
All observations
Arrows are plotted where greater than 10 obs are present

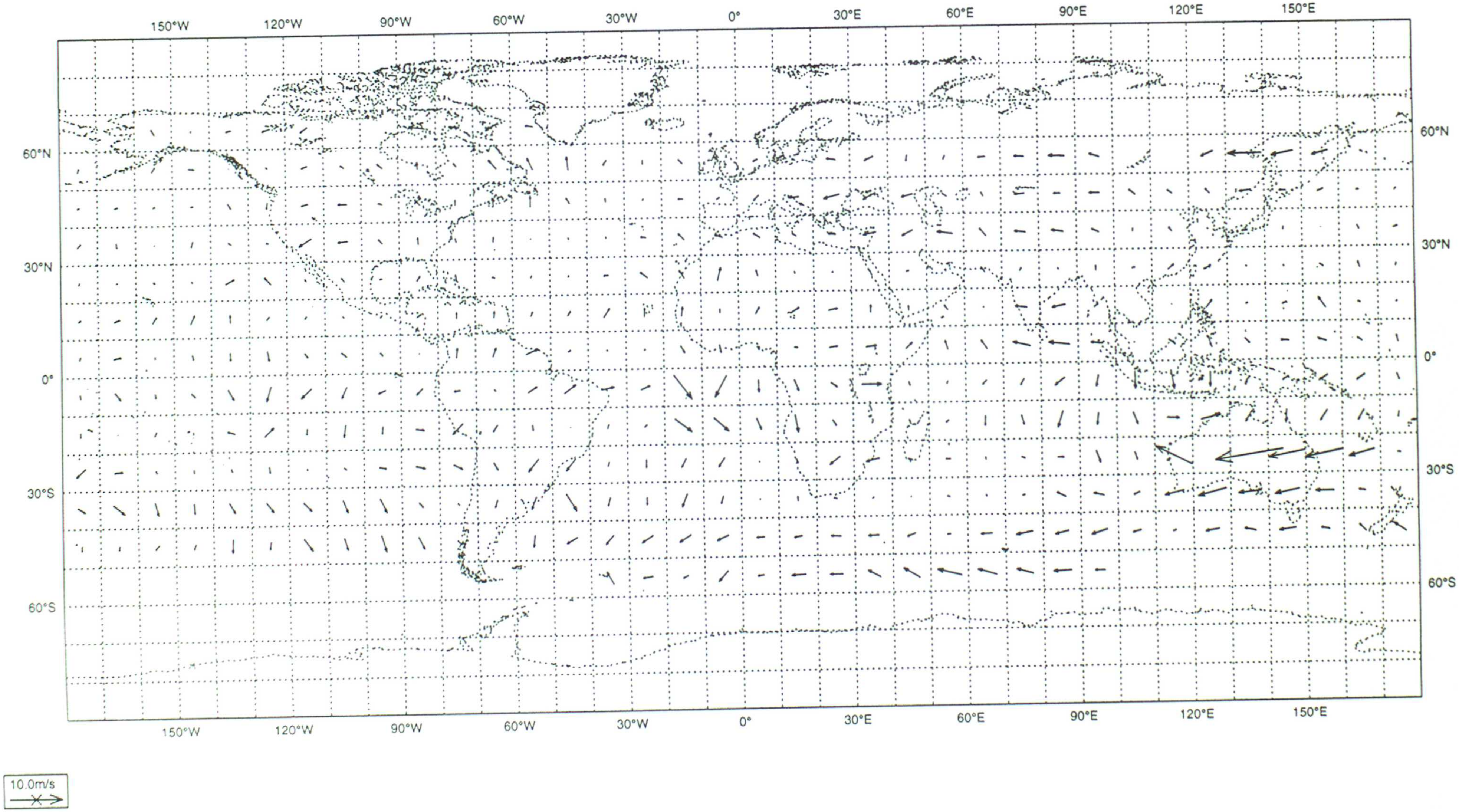

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). SEPTEMBER 2002
All observations
Values are plotted where greater than 10 obs are present

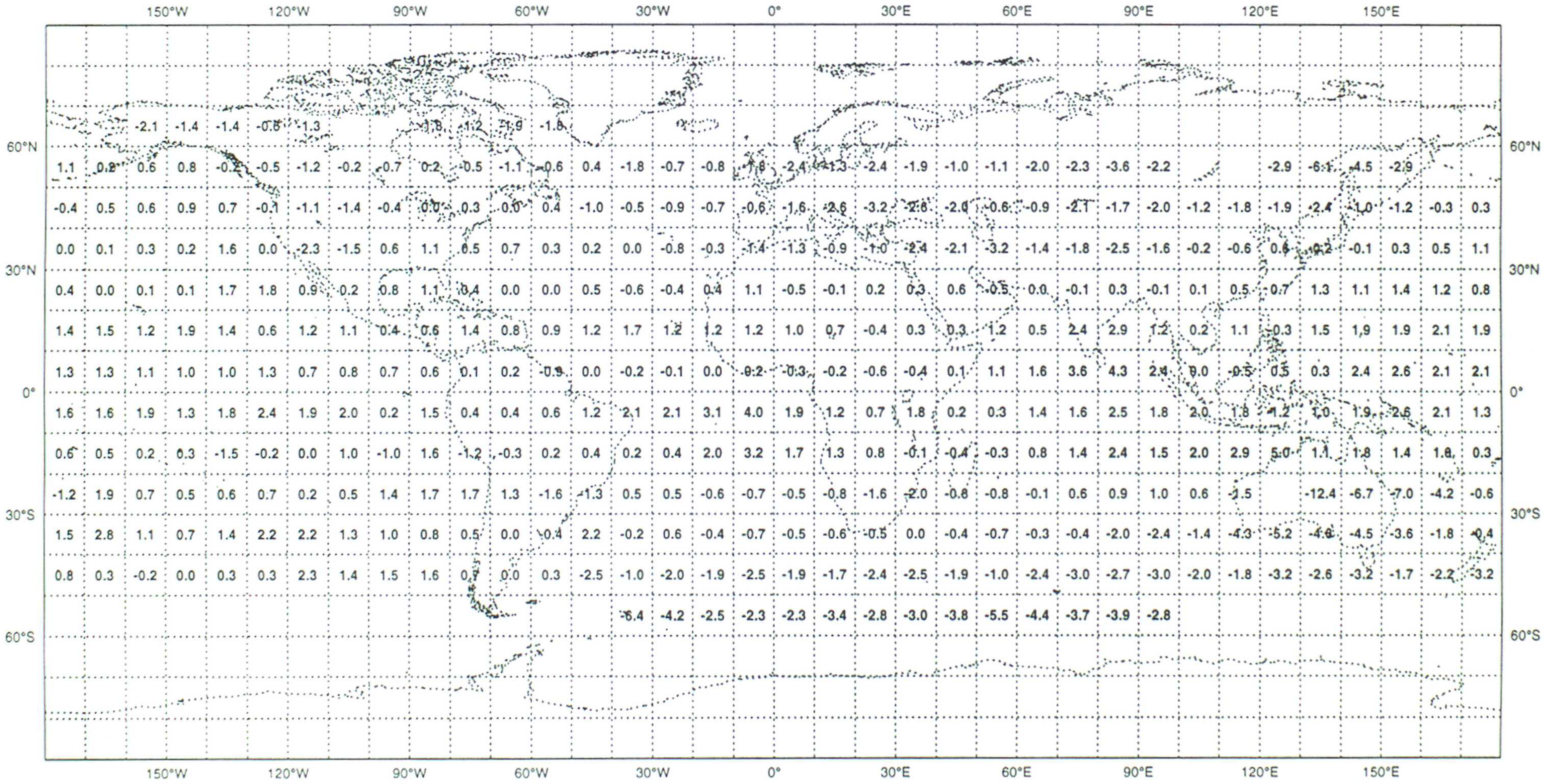
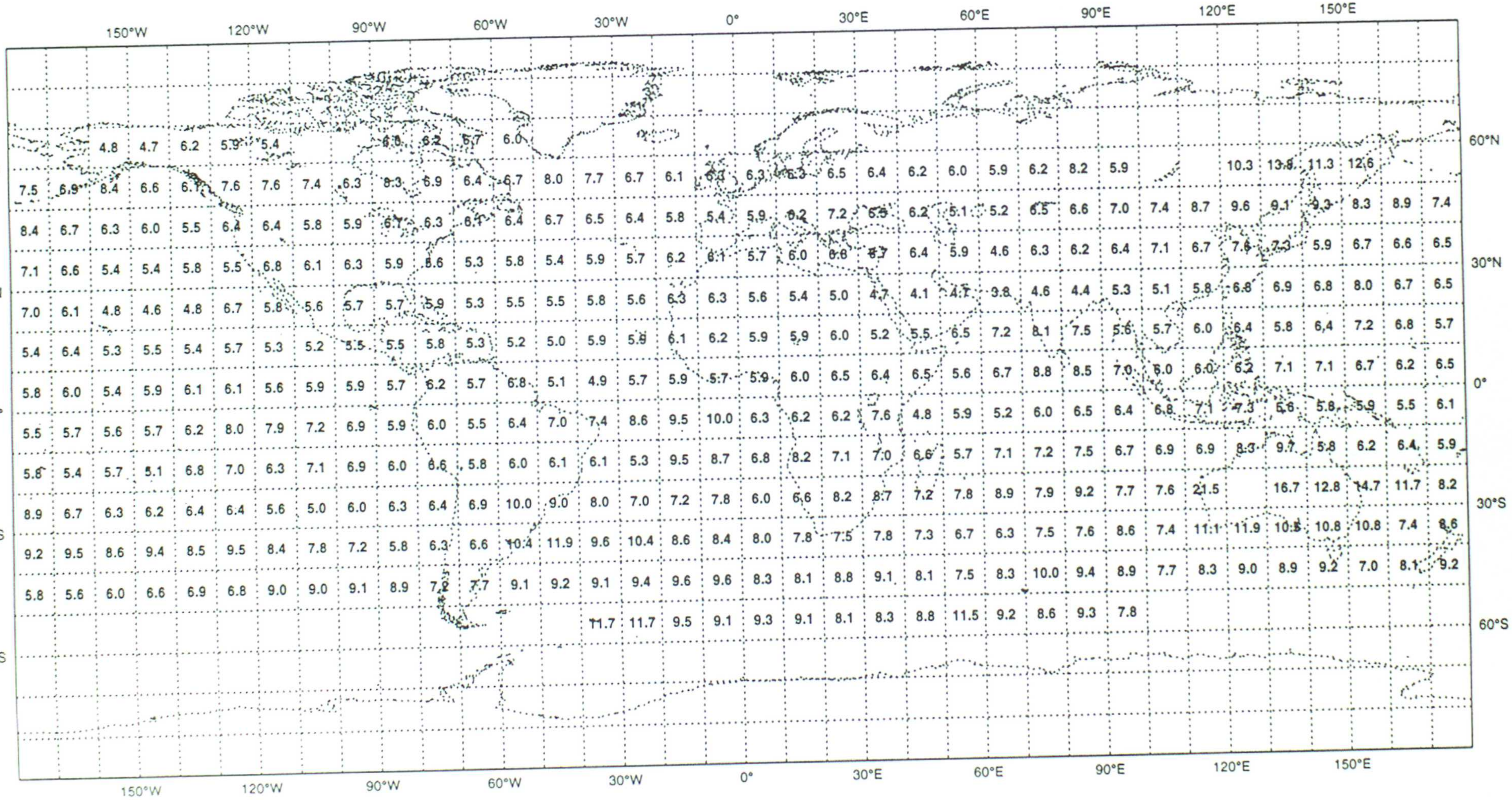

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-2.1 -1.4 -1.4 -0.6 -1.3 -1.8 -1.2 -1.9 -1.8
1.1 0.2 0.6 0.8 -0.2 -0.5 -1.2 -0.2 -0.7 0.2 -0.5 -1.1 -0.6 0.4 -1.8 -0.7 -0.8 -1.8 -2.4 -1.3 -2.4 -1.9 -1.0 -1.1 -2.0 -2.3 -3.6 -2.2 -2.9 -6.1 -4.5 -2.9
-0.4 0.5 0.6 0.9 0.7 -0.1 -1.1 -1.4 -0.4 0.0 0.3 0.0 0.4 -1.0 -0.5 -0.9 -0.7 -0.6 -1.6 -2.6 -3.2 -2.6 -2.0 -0.6 -0.9 -2.1 -1.7 -2.0 -1.2 -1.8 -1.9 -2.4 -1.0 -1.2 -0.3 0.3
0.0 0.1 0.3 0.2 1.6 0.0 -2.3 -1.5 0.6 1.1 0.5 0.7 0.3 0.2 0.0 -0.8 -0.3 -1.4 -1.3 -0.9 -1.0 -2.4 -2.1 -3.2 -1.4 -1.8 -2.5 -1.6 -0.2 -0.6 0.6 -0.2 -0.1 0.3 0.5 1.1
0.4 0.0 0.1 0.1 1.7 1.8 0.9 -0.2 0.8 1.1 0.4 0.0 0.0 0.5 -0.6 -0.4 0.4 1.1 -0.5 -0.1 0.2 0.3 0.6 -0.5 0.0 -0.1 0.3 -0.1 0.1 0.5 -0.7 1.3 1.1 1.4 1.2 0.8
1.4 1.5 1.2 1.9 1.4 0.6 1.2 1.1 0.4 0.6 1.4 0.8 0.9 1.2 1.7 1.2 1.2 1.2 1.0 0.7 -0.4 0.3 0.3 1.2 0.5 2.4 2.9 1.2 0.2 1.1 -0.3 1.5 1.9 1.9 2.1 1.9
1.3 1.3 1.1 1.0 1.0 1.3 0.7 0.8 0.7 0.6 0.1 0.2 -0.9 0.0 -0.2 -0.1 0.0 0.2 -0.3 -0.2 -0.6 -0.4 0.1 1.1 1.6 3.6 4.3 2.4 0.0 -0.5 0.5 0.3 2.4 2.6 2.1 2.1
1.6 1.6 1.9 1.3 1.8 2.4 1.9 2.0 0.2 1.5 0.4 0.4 0.6 1.2 2.1 2.1 3.1 4.0 1.9 1.2 0.7 1.8 0.2 0.3 1.4 1.6 2.5 1.8 2.0 1.8 -1.2 1.0 1.9 2.6 2.1 1.3
0.6 0.5 0.2 0.3 -1.5 -0.2 0.0 1.0 -1.0 1.6 -1.2 -0.3 0.2 0.4 0.2 0.4 2.0 3.2 1.7 1.3 0.8 -0.1 -0.4 -0.3 0.8 1.4 2.4 1.5 2.0 2.9 5.0 1.1 1.8 1.4 1.8 0.3
-1.2 1.9 0.7 0.5 0.6 0.7 0.2 0.5 1.4 1.7 1.7 1.3 -1.6 -1.3 0.5 0.5 -0.6 -0.7 -0.5 -0.8 -1.6 -2.0 -0.8 -0.8 -0.1 0.6 0.9 1.0 0.6 -1.5 -12.4 -6.7 -7.0 -4.2 -0.6
1.5 2.8 1.1 0.7 1.4 2.2 2.2 1.3 1.0 0.8 0.5 0.0 0.4 2.2 -0.2 0.6 -0.4 -0.7 -0.5 -0.6 -0.5 0.0 -0.4 -0.7 -0.3 -0.4 -2.0 -2.4 -1.4 -4.3 -5.2 -4.6 -4.5 -3.6 -1.8 0.4
0.8 0.3 -0.2 0.0 0.3 0.3 2.3 1.4 1.5 1.6 0.7 0.0 0.3 -2.5 -1.0 -2.0 -1.9 -2.5 -1.9 -1.7 -2.4 -2.5 -1.9 -1.0 -2.4 -3.0 -2.7 -3.0 -2.0 -1.8 -3.2 -2.6 -3.2 -1.7 -2.2 -3.2
-6.4 -4.2 -2.5 -2.3 -2.3 -3.4 -2.8 -3.0 -3.8 -5.5 -4.4 -3.7 -3.9 -2.8

Figure 24. SATOB 101 - 400 hPa RMS O-B vector differences (ms-1). SEPTEMBER 2002
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.8 4.7 6.2 5.9 5.4 6.0 6.2 5.7 6.0
7.5 6.9 8.4 6.6 6.7 7.6 7.6 7.4 6.3 8.3 6.9 6.4 6.7 8.0 7.7 6.7 6.1 6.3 6.3 6.3 6.5 6.4 6.2 6.0 5.9 6.2 8.2 5.9 10.3 13.8 11.3 12.6
8.4 6.7 6.3 6.0 5.5 6.4 6.4 5.8 5.9 6.7 6.3 6.1 6.4 6.7 6.5 6.4 5.8 5.4 5.9 9.2 7.2 6.5 6.2 5.1 5.2 6.5 6.6 7.0 7.4 8.7 9.6 9.1 9.3 8.3 8.9 7.4
7.1 6.6 5.4 5.4 5.8 5.5 6.8 6.1 6.3 5.9 8.6 5.3 5.8 5.4 5.9 5.7 6.2 8.1 5.7 6.0 6.8 8.7 6.4 5.9 4.6 6.3 6.2 6.4 7.1 6.7 7.6 7.3 5.9 6.7 6.6 6.5
7.0 6.1 4.8 4.6 4.8 6.7 5.8 5.6 5.7 5.7 5.9 5.3 5.5 5.5 5.8 5.6 6.3 6.3 5.6 5.4 5.0 4.7 4.1 4.7 3.8 4.6 4.4 5.3 5.1 5.8 6.8 6.9 6.8 8.0 6.7 6.5
5.4 6.4 5.3 5.5 5.4 5.7 5.3 5.2 5.5 5.5 5.8 5.3 5.2 5.0 5.9 5.8 6.1 6.2 5.9 5.9 6.0 5.2 5.5 6.5 7.2 8.1 7.5 5.6 5.7 6.0 6.4 5.8 6.4 7.2 6.8 5.7
5.8 6.0 5.4 5.9 6.1 6.1 5.6 5.9 5.9 5.7 6.2 5.7 6.8 5.1 4.9 5.7 5.9 5.7 5.9 6.0 6.5 6.4 6.5 5.6 6.7 8.8 8.5 7.0 6.0 6.0 6.2 7.1 7.1 6.7 6.2 6.5
5.5 5.7 5.6 5.7 6.2 8.0 7.9 7.2 6.9 5.9 6.0 5.5 6.4 7.0 7.4 8.6 9.5 10.0 6.3 6.2 6.2 7.6 4.8 5.9 5.2 6.0 6.5 6.4 6.8 7.1 7.3 5.6 5.8 5.9 5.5 6.1
5.8 5.4 5.7 5.1 6.8 7.0 6.3 7.1 6.9 6.0 6.6 5.8 6.0 6.1 6.1 5.3 9.5 8.7 6.8 8.2 7.1 7.0 6.6 5.7 7.1 7.2 7.5 6.7 6.9 6.9 8.3 9.7 5.8 6.2 6.4 5.9
8.9 6.7 6.3 6.2 6.4 6.4 5.6 5.0 6.0 6.3 6.4 6.9 10.0 9.0 8.0 7.0 7.2 7.8 6.0 6.6 8.2 8.7 7.2 7.8 8.9 7.9 9.2 7.7 7.6 21.5 16.7 12.8 14.7 11.7 8.2
9.2 9.5 8.6 9.4 8.5 9.5 8.4 7.8 7.2 5.8 6.3 6.6 10.4 11.9 9.6 10.4 8.6 8.4 8.0 7.8 7.5 7.8 7.3 6.7 6.3 7.5 7.6 8.6 7.4 11.1 11.9 10.5 10.8 10.8 7.4 8.6
5.8 5.6 6.0 6.6 6.9 6.8 9.0 9.0 9.1 8.9 7.2 7.7 9.1 9.2 9.1 9.4 9.6 9.6 8.3 8.1 8.8 9.1 8.1 7.5 8.3 10.0 9.4 8.9 7.7 8.3 9.0 8.9 9.2 7.0 8.1 9.2
11.7 11.7 9.5 9.1 9.3 9.1 8.1 8.3 8.8 11.5 9.2 8.6 9.3 7.8

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15 and NOAA-16.

Standard of comparison :Background field from UKMO global model.

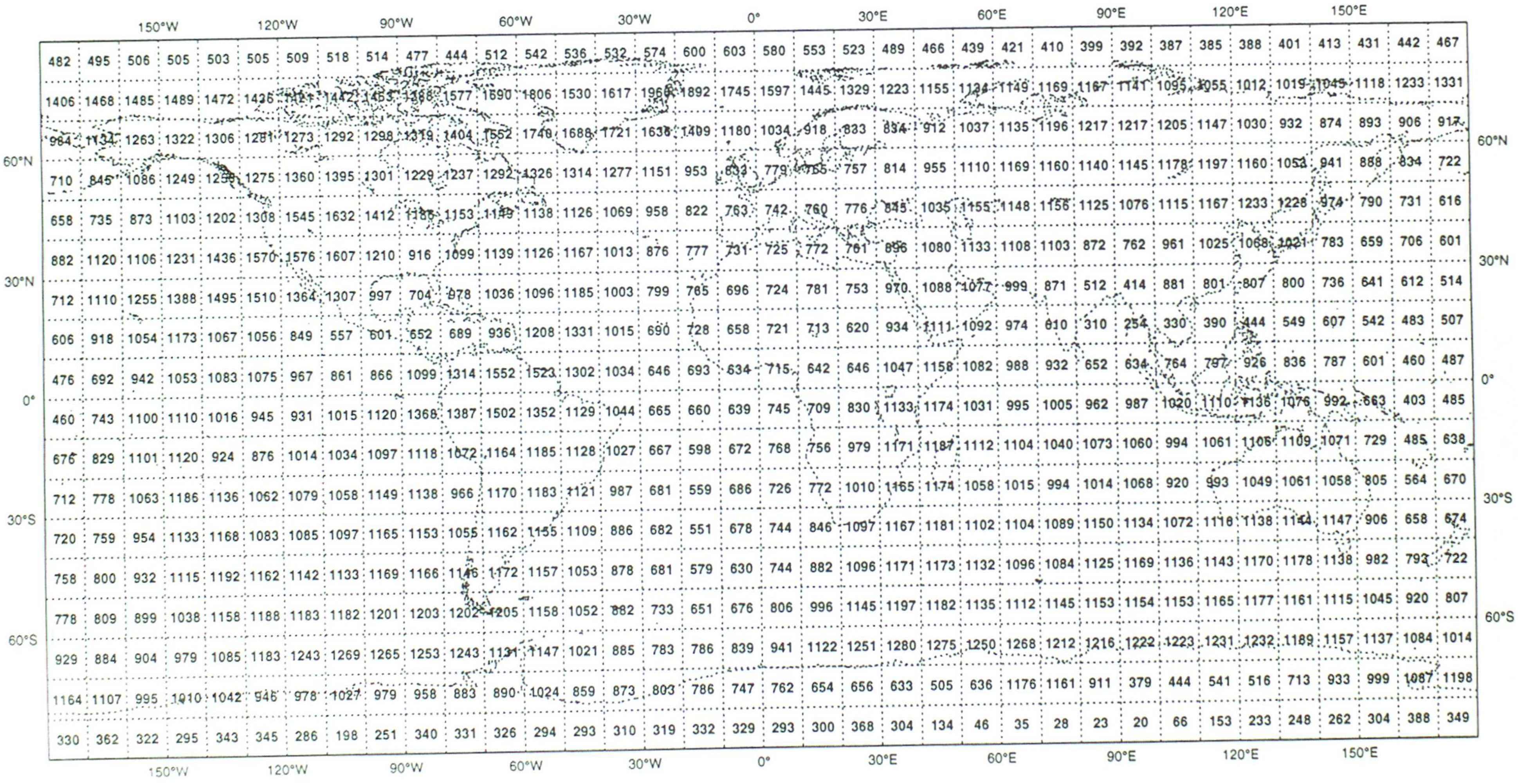
Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)
HIRS15 (700)
HIRS11 (500-700)
HIRS4 (400)
AMSUA5 (700)
AMSUA7 (300)
AMSUA9 (100)

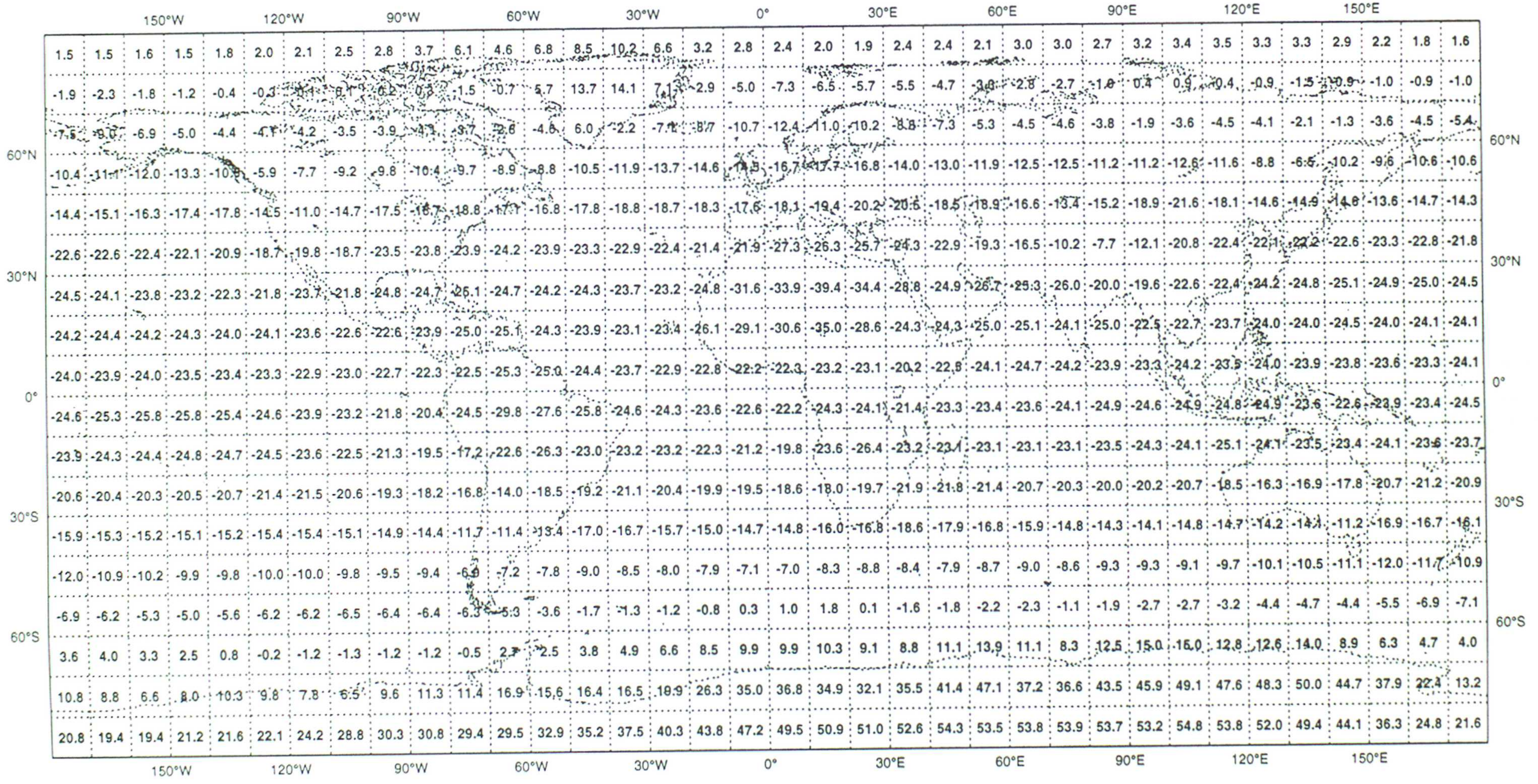
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. SEPTEMBER 2002
NOAA15, using all observations
Global average number of observations in 24 hours = 610510



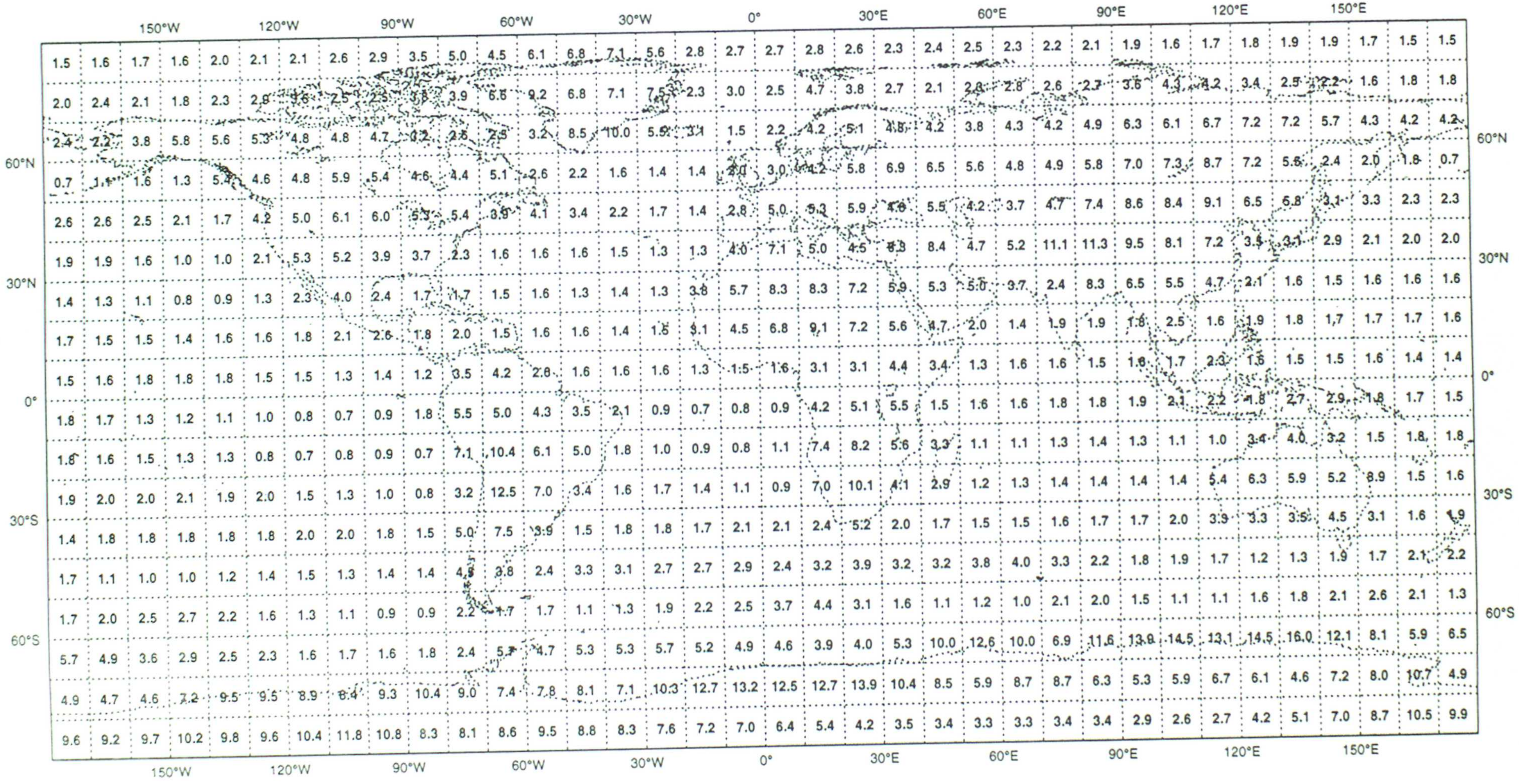
482	495	506	505	503	505	509	518	514	477	444	512	542	536	532	574	600	603	580	553	523	489	466	439	421	410	399	392	387	385	388	401	413	431	442	467
1406	1468	1485	1489	1472	1426	1421	1442	1453	1388	1577	1690	1806	1530	1617	1966	1892	1745	1597	1445	1329	1223	1155	1124	1149	1169	1167	1141	1095	1055	1012	1019	1045	1118	1233	1331
984	1134	1263	1322	1306	1281	1273	1292	1298	1319	1404	1552	1740	1688	1721	1638	1409	1180	1034	918	833	834	912	1037	1135	1196	1217	1217	1205	1147	1030	932	874	893	906	917
710	845	1086	1249	1258	1275	1360	1395	1301	1229	1237	1292	1326	1314	1277	1151	953	633	779	755	757	814	955	1110	1169	1160	1140	1145	1178	1197	1160	1053	941	888	834	722
658	735	873	1103	1202	1308	1545	1632	1412	1186	1153	1149	1138	1126	1069	958	822	763	742	760	776	845	1035	1155	1148	1156	1125	1076	1115	1167	1233	1228	974	790	731	616
882	1120	1106	1231	1436	1570	1576	1607	1210	916	1099	1139	1126	1167	1013	876	777	731	725	772	761	896	1080	1133	1108	1103	872	762	961	1025	1068	1021	783	659	706	601
712	1110	1255	1388	1495	1510	1364	1307	997	704	978	1036	1096	1185	1003	799	765	696	724	781	753	970	1088	1077	999	871	512	414	881	801	807	800	736	641	612	514
606	918	1054	1173	1067	1056	849	557	601	652	689	936	1208	1331	1015	690	728	658	721	713	620	934	1111	1092	974	610	310	254	330	390	444	549	607	542	483	507
476	692	942	1053	1083	1075	967	861	866	1099	1314	1552	1523	1302	1034	646	693	634	715	642	646	1047	1158	1082	988	932	652	634	764	797	926	836	787	601	460	487
460	743	1100	1110	1016	945	931	1015	1120	1368	1387	1502	1352	1129	1044	665	660	639	745	709	830	1133	1174	1031	995	1005	962	987	1020	1110	1136	1076	992	663	403	485
676	829	1101	1120	924	876	1014	1034	1097	1118	1072	1164	1185	1128	1027	667	598	672	768	756	979	1171	1187	1112	1104	1040	1073	1060	994	1061	1106	1109	1071	729	485	638
712	778	1063	1186	1136	1062	1079	1058	1149	1138	966	1170	1183	1121	987	681	559	686	726	772	1010	1165	1174	1058	1015	994	1014	1068	920	993	1049	1061	1058	805	564	670
720	759	954	1133	1168	1083	1085	1097	1165	1153	1055	1162	1155	1109	886	682	551	678	744	846	1097	1167	1181	1102	1104	1089	1150	1134	1072	1116	1138	1144	1147	906	658	674
758	800	932	1115	1192	1162	1142	1133	1169	1166	1146	1172	1157	1053	878	681	579	630	744	882	1096	1171	1173	1132	1096	1084	1125	1169	1136	1143	1170	1178	1138	982	793	722
778	809	899	1038	1158	1188	1183	1182	1201	1203	1202	1205	1158	1052	882	733	651	676	806	996	1145	1197	1182	1135	1112	1145	1153	1154	1153	1165	1177	1161	1115	1045	920	807
929	884	904	979	1085	1183	1243	1269	1265	1253	1243	1131	1147	1021	885	783	786	839	941	1122	1251	1280	1275	1250	1268	1212	1216	1222	1223	1231	1232	1189	1157	1137	1084	1014
1164	1107	995	1010	1042	946	978	1027	979	958	883	890	1024	859	873	803	786	747	762	654	656	633	505	636	1176	1161	911	379	444	541	516	713	933	999	1087	1198
330	362	322	295	343	345	286	198	251	340	331	326	294	293	310	319	332	329	293	300	368	304	134	46	35	28	23	20	66	153	233	248	262	304	388	349

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations



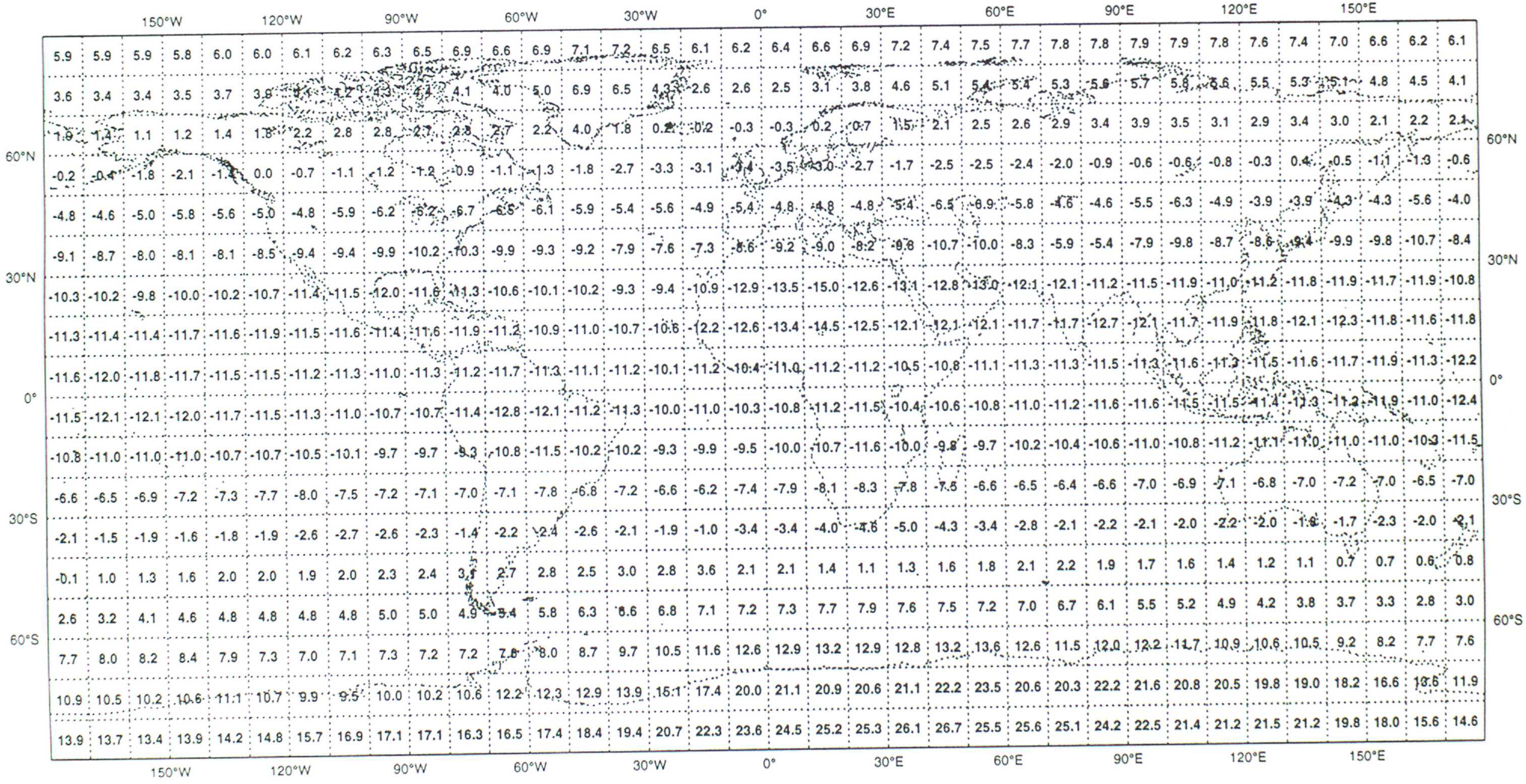
1.5	1.5	1.6	1.5	1.8	2.0	2.1	2.5	2.8	3.7	6.1	4.6	6.8	8.5	10.2	6.6	3.2	2.8	2.4	2.0	1.9	2.4	2.4	2.1	3.0	3.0	2.7	3.2	3.4	3.5	3.3	3.3	2.9	2.2	1.8	1.6
-1.9	-2.3	-1.8	-1.2	-0.4	-0.3	-0.1	0.1	-0.2	0.3	-1.5	-0.7	5.7	13.7	14.1	7.1	-2.9	-5.0	-7.3	-6.5	-5.7	-5.5	-4.7	-3.0	-2.8	-2.7	-1.0	0.4	0.9	-0.4	-0.9	-1.5	-0.9	-1.0	-0.9	-1.0
-7.5	-9.0	-6.9	-5.0	-4.4	-4.1	-4.2	-3.5	-3.9	-4.1	-3.7	-2.6	-4.6	6.0	-2.2	-7.1	-8.7	-10.7	-12.4	-11.0	-10.2	-8.8	-7.3	-5.3	-4.5	-4.6	-3.8	-1.9	-3.6	-4.5	-4.1	-2.1	-1.3	-3.6	-4.5	-5.4
-10.4	-11.1	-12.0	-13.3	-10.8	-5.9	-7.7	-9.2	-9.8	-10.4	-9.7	-8.9	-8.8	-10.5	-11.9	-13.7	-14.6	-14.5	-16.7	-17.7	-16.8	-14.0	-13.0	-11.9	-12.5	-12.5	-11.2	-11.2	-12.6	-11.6	-8.8	-6.5	-10.2	-9.6	-10.6	-10.6
-14.4	-15.1	-16.3	-17.4	-17.8	-14.5	-11.0	-14.7	-17.5	-16.7	-18.8	-17.1	-16.8	-17.8	-18.8	-18.7	-18.3	-17.6	-18.1	-19.4	-20.2	-20.6	-18.5	-18.9	-16.6	-13.4	-15.2	-18.9	-21.6	-18.1	-14.6	-14.9	-14.8	-13.6	-14.7	-14.3
-22.6	-22.6	-22.4	-22.1	-20.9	-18.7	-19.8	-18.7	-23.5	-23.8	-23.9	-24.2	-23.9	-23.3	-22.9	-22.4	-21.4	-21.9	-27.3	-26.3	-25.7	-24.3	-22.9	-19.3	-16.5	-10.2	-7.7	-12.1	-20.8	-22.4	-22.1	-22.2	-22.6	-23.3	-22.8	-21.8
-24.5	-24.1	-23.8	-23.2	-22.3	-21.8	-23.7	-21.8	-24.8	-24.7	-26.1	-24.7	-24.2	-24.3	-23.7	-23.2	-24.8	-31.6	-33.9	-39.4	-34.4	-28.8	-24.9	-26.7	-25.3	-26.0	-20.0	-19.6	-22.6	-22.4	-24.2	-24.8	-25.1	-24.9	-25.0	-24.5
-24.2	-24.4	-24.2	-24.3	-24.0	-24.1	-23.6	-22.6	-22.6	-23.9	-25.0	-25.1	-24.3	-23.9	-23.1	-23.4	-26.1	-29.1	-30.6	-35.0	-28.6	-24.3	-24.3	-25.0	-25.1	-24.1	-25.0	-22.5	-22.7	-23.7	-24.0	-24.0	-24.5	-24.0	-24.1	-24.1
-24.0	-23.9	-24.0	-23.5	-23.4	-23.3	-22.9	-23.0	-22.7	-22.3	-22.5	-25.3	-25.0	-24.4	-23.7	-22.9	-22.8	-22.2	-22.3	-23.2	-23.1	-20.2	-22.8	-24.1	-24.7	-24.2	-23.9	-23.3	-24.2	-23.5	-24.0	-23.9	-23.8	-23.6	-23.3	-24.1
-24.6	-25.3	-25.8	-25.8	-25.4	-24.6	-23.9	-23.2	-21.8	-20.4	-24.5	-29.8	-27.6	-25.8	-24.6	-24.3	-23.6	-22.6	-22.2	-24.3	-24.1	-21.4	-23.3	-23.4	-23.6	-24.1	-24.9	-24.6	-24.9	-24.8	-24.9	-23.6	-22.6	-23.9	-23.4	-24.5
-23.9	-24.3	-24.4	-24.8	-24.7	-24.5	-23.6	-22.5	-21.3	-19.5	-17.2	-22.6	-26.3	-23.0	-23.2	-23.2	-22.3	-21.2	-19.8	-23.6	-26.4	-23.2	-23.1	-23.1	-23.1	-23.1	-23.5	-24.3	-24.1	-25.1	-24.1	-23.5	-23.4	-24.1	-23.6	-23.7
-20.6	-20.4	-20.3	-20.5	-20.7	-21.4	-21.5	-20.6	-19.3	-18.2	-16.8	-14.0	-18.5	-19.2	-21.1	-20.4	-19.9	-19.5	-18.6	-18.0	-19.7	-21.9	-21.8	-21.4	-20.7	-20.3	-20.0	-20.2	-20.7	-18.5	-16.3	-16.9	-17.8	-20.7	-21.2	-20.9
-15.9	-15.3	-15.2	-15.1	-15.2	-15.4	-15.4	-15.1	-14.9	-14.4	-11.7	-11.4	-13.4	-17.0	-16.7	-15.7	-15.0	-14.7	-14.8	-16.0	-16.8	-18.6	-17.9	-16.8	-15.9	-14.8	-14.3	-14.1	-14.8	-14.7	-14.2	-14.1	-11.2	-16.9	-16.7	-16.1
-12.0	-10.9	-10.2	-9.9	-9.8	-10.0	-10.0	-9.8	-9.5	-9.4	-6.9	-7.2	-7.8	-9.0	-8.5	-8.0	-7.9	-7.1	-7.0	-8.3	-8.8	-8.4	-7.9	-8.7	-9.0	-8.6	-9.3	-9.3	-9.1	-9.7	-10.1	-10.5	-11.1	-12.0	-11.7	-10.9
-6.9	-6.2	-5.3	-5.0	-5.6	-6.2	-6.2	-6.5	-6.4	-6.4	-6.3	-5.3	-3.6	-1.7	-1.3	-1.2	-0.8	0.3	1.0	1.8	0.1	-1.6	-1.8	-2.2	-2.3	-1.1	-1.9	-2.7	-2.7	-3.2	-4.4	-4.7	-4.4	-5.5	-6.9	-7.1
3.6	4.0	3.3	2.5	0.8	-0.2	-1.2	-1.3	-1.2	-1.2	-0.5	2.7	2.5	3.8	4.9	6.6	8.5	9.9	9.9	10.3	9.1	8.8	11.1	13.9	11.1	8.3	12.5	15.0	16.0	12.8	12.6	14.0	8.9	6.3	4.7	4.0
10.8	8.8	6.6	8.0	10.3	9.8	7.8	6.5	9.6	11.3	11.4	16.9	15.6	16.4	16.5	18.9	26.3	35.0	36.8	34.9	32.1	35.5	41.4	47.1	37.2	36.6	43.5	45.9	49.1	47.6	48.3	50.0	44.7	37.9	22.4	13.2
20.8	19.4	19.4	21.2	21.6	22.1	24.2	28.8	30.3	30.8	29.4	29.5	32.9	35.2	37.5	40.3	43.8	47.2	49.5	50.9	51.0	52.6	54.3	53.5	53.8	53.9	53.7	53.2	54.8	53.8	52.0	49.4	44.1	36.3	24.8	21.6

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations



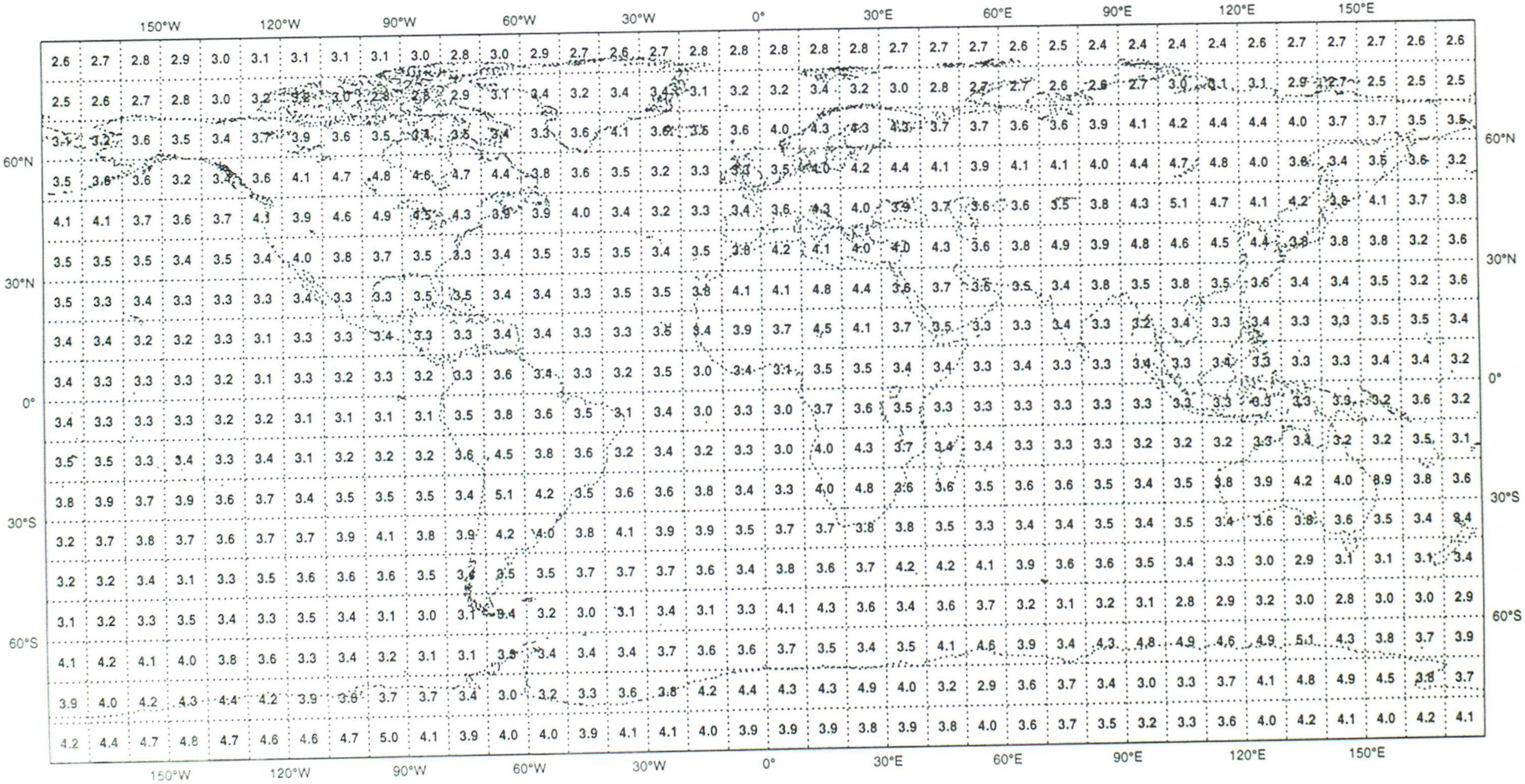
1.5	1.6	1.7	1.6	2.0	2.1	2.1	2.6	2.9	3.5	5.0	4.5	6.1	6.8	7.1	5.6	2.8	2.7	2.7	2.8	2.6	2.3	2.4	2.5	2.3	2.2	2.1	1.9	1.6	1.7	1.8	1.9	1.9	1.7	1.5	1.5
2.0	2.4	2.1	1.8	2.3	2.8	3.6	2.5	2.5	3.8	3.9	6.6	9.2	6.8	7.1	7.5	2.3	3.0	2.5	4.7	3.8	2.7	2.1	2.8	2.8	2.6	2.7	3.6	4.3	4.2	3.4	2.5	2.2	1.6	1.8	1.8
2.4	2.2	3.8	5.8	5.6	5.3	4.8	4.8	4.7	3.2	2.6	2.5	3.2	8.5	10.0	5.9	3.1	1.5	2.2	4.2	5.1	4.8	4.2	3.8	4.3	4.2	4.9	6.3	6.1	6.7	7.2	7.2	5.7	4.3	4.2	4.2
0.7	1.1	1.6	1.3	5.4	4.6	4.8	5.9	5.4	4.6	4.4	5.1	2.6	2.2	1.6	1.4	1.4	2.0	3.0	4.2	5.8	6.9	6.5	5.6	4.8	4.9	5.8	7.0	7.3	8.7	7.2	5.6	2.4	2.0	1.8	0.7
2.6	2.6	2.5	2.1	1.7	4.2	5.0	6.1	6.0	5.3	5.4	3.9	4.1	3.4	2.2	1.7	1.4	2.8	5.0	5.3	5.9	4.6	5.5	4.2	3.7	4.7	7.4	8.6	8.4	9.1	6.5	6.8	3.1	3.3	2.3	2.3
1.9	1.9	1.6	1.0	1.0	2.1	5.3	5.2	3.9	3.7	2.3	1.6	1.6	1.6	1.5	1.3	1.3	4.0	7.1	5.0	4.5	8.3	8.4	4.7	5.2	11.1	11.3	9.5	8.1	7.2	3.5	3.1	2.9	2.1	2.0	2.0
1.4	1.3	1.1	0.8	0.9	1.3	2.3	4.0	2.4	1.7	1.7	1.5	1.6	1.3	1.4	1.3	3.8	5.7	8.3	8.3	7.2	5.9	5.3	5.0	3.7	2.4	8.3	6.5	5.5	4.7	2.1	1.6	1.5	1.6	1.6	1.6
1.7	1.5	1.5	1.4	1.6	1.6	1.8	2.1	2.6	1.8	2.0	1.5	1.6	1.6	1.4	1.5	3.1	4.5	6.8	9.1	7.2	5.6	4.7	2.0	1.4	1.9	1.9	1.8	2.5	1.6	1.9	1.8	1.7	1.7	1.7	1.6
1.5	1.6	1.8	1.8	1.8	1.5	1.5	1.3	1.4	1.2	3.5	4.2	2.8	1.6	1.6	1.6	1.3	1.5	1.6	3.1	3.1	4.4	3.4	1.3	1.6	1.6	1.5	1.6	1.7	2.3	1.6	1.5	1.5	1.6	1.4	1.4
1.8	1.7	1.3	1.2	1.1	1.0	0.8	0.7	0.9	1.8	5.5	5.0	4.3	3.5	2.1	0.9	0.7	0.8	0.9	4.2	5.1	5.5	1.5	1.6	1.6	1.8	1.8	1.9	2.1	2.2	1.8	2.7	2.9	1.8	1.7	1.5
1.8	1.6	1.5	1.3	1.3	0.8	0.7	0.8	0.9	0.7	7.1	10.4	6.1	5.0	1.8	1.0	0.9	0.8	1.1	7.4	8.2	5.6	3.3	1.1	1.1	1.3	1.4	1.3	1.1	1.0	3.4	4.0	3.2	1.5	1.8	1.8
1.9	2.0	2.0	2.1	1.9	2.0	1.5	1.3	1.0	0.8	3.2	12.5	7.0	3.4	1.6	1.7	1.4	1.1	0.9	7.0	10.1	4.1	2.9	1.2	1.3	1.4	1.4	1.4	1.4	5.4	6.3	5.9	5.2	8.9	1.5	1.6
1.4	1.8	1.8	1.8	1.8	1.8	2.0	2.0	1.8	1.5	5.0	7.5	3.9	1.5	1.8	1.8	1.7	2.1	2.1	2.4	5.2	2.0	1.7	1.5	1.5	1.6	1.7	1.7	2.0	3.9	3.3	3.5	4.5	3.1	1.6	1.9
1.7	1.1	1.0	1.0	1.2	1.4	1.5	1.3	1.4	1.4	4.5	3.8	2.4	3.3	3.1	2.7	2.7	2.9	2.4	3.2	3.9	3.2	3.2	3.8	4.0	3.3	2.2	1.8	1.9	1.7	1.2	1.3	1.9	1.7	2.1	2.2
1.7	2.0	2.5	2.7	2.2	1.6	1.3	1.1	0.9	0.9	2.2	1.7	1.7	1.1	1.3	1.9	2.2	2.5	3.7	4.4	3.1	1.6	1.1	1.2	1.0	2.1	2.0	1.5	1.1	1.1	1.6	1.8	2.1	2.6	2.1	1.3
5.7	4.9	3.6	2.9	2.5	2.3	1.6	1.7	1.6	1.8	2.4	5.7	4.7	5.3	5.3	5.7	5.2	4.9	4.6	3.9	4.0	5.3	10.0	12.6	10.0	6.9	11.6	13.8	14.5	13.1	14.5	16.0	12.1	8.1	5.9	6.5
4.9	4.7	4.6	7.2	9.5	9.5	8.9	8.4	9.3	10.4	9.0	7.4	7.8	8.1	7.1	10.3	12.7	13.2	12.5	12.7	13.9	10.4	8.5	5.9	8.7	8.7	6.3	5.3	5.9	6.7	6.1	4.6	7.2	8.0	10.7	4.9
9.6	9.2	9.7	10.2	9.8	9.6	10.4	11.8	10.8	8.3	8.1	8.6	9.5	8.8	8.3	7.6	7.2	7.0	6.4	5.4	4.2	3.5	3.4	3.3	3.3	3.4	3.4	2.9	2.6	2.7	4.2	5.1	7.0	8.7	10.5	9.9

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



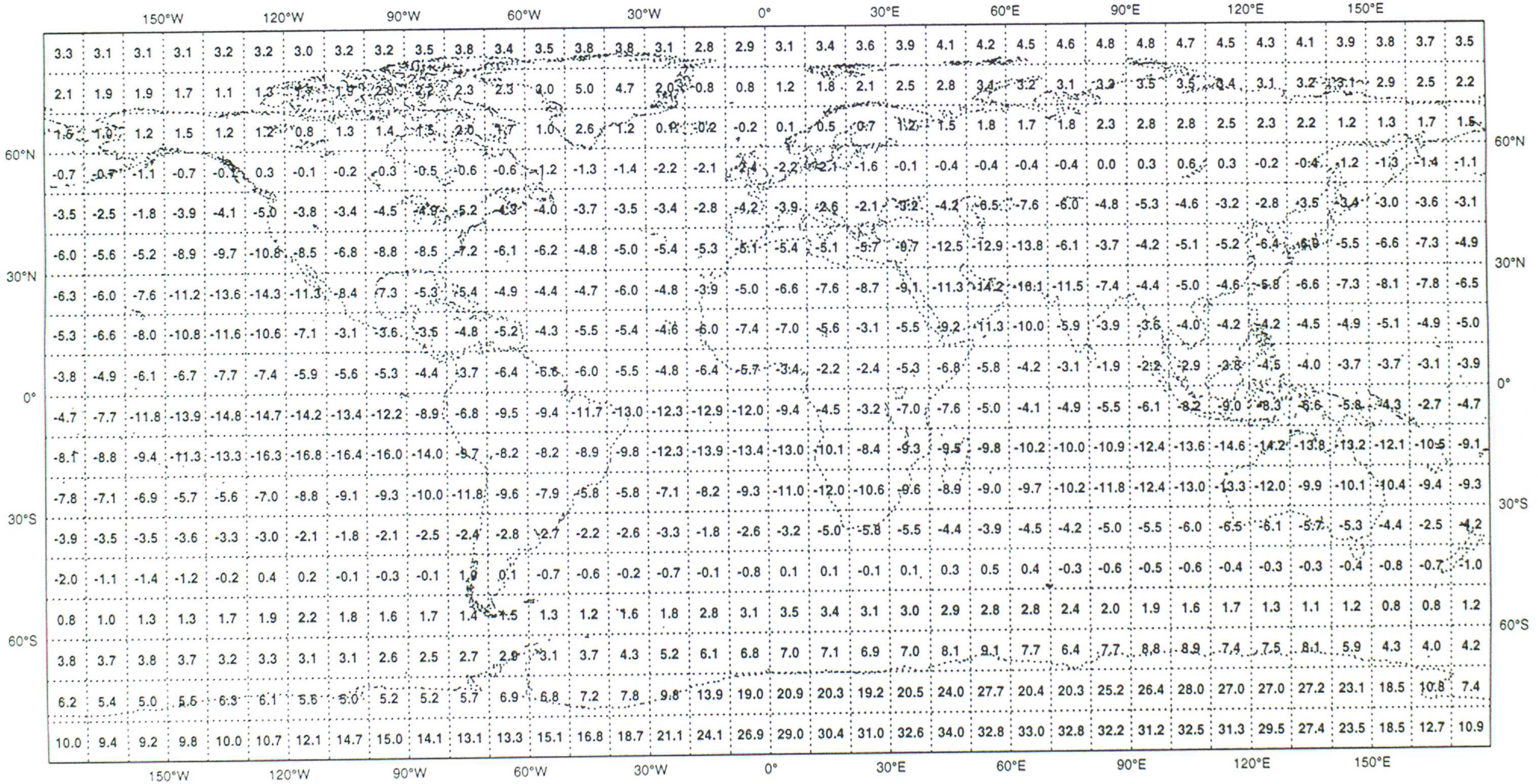
5.9	5.9	5.9	5.8	6.0	6.0	6.1	6.2	6.3	6.5	6.9	6.6	6.9	7.1	7.2	6.5	6.1	6.2	6.4	6.6	6.9	7.2	7.4	7.5	7.7	7.8	7.8	7.9	7.9	7.8	7.6	7.4	7.0	6.6	6.2	6.1
3.6	3.4	3.4	3.5	3.7	3.8	4.1	4.2	4.3	4.4	4.1	4.0	5.0	6.9	6.5	4.3	2.6	2.6	2.5	3.1	3.8	4.6	5.1	5.4	5.4	5.3	5.6	5.7	5.8	5.6	5.5	5.3	5.1	4.8	4.5	4.1
1.9	1.4	1.1	1.2	1.4	1.8	2.2	2.8	2.8	2.7	2.8	2.7	2.2	4.0	1.8	0.2	-0.2	-0.3	-0.3	0.2	0.7	1.5	2.1	2.5	2.6	2.9	3.4	3.9	3.5	3.1	2.9	3.4	3.0	2.1	2.2	2.1
-0.2	-0.4	-1.8	-2.1	-1.4	0.0	-0.7	-1.1	-1.2	-1.2	-0.9	-1.1	-1.3	-1.8	-2.7	-3.3	-3.1	-3.4	-3.5	-3.0	-2.7	-1.7	-2.5	-2.5	-2.4	-2.0	-0.9	-0.6	-0.6	-0.8	-0.3	0.4	-0.5	-1.1	-1.3	-0.6
-4.8	-4.6	-5.0	-5.8	-5.6	-5.0	-4.8	-5.9	-6.2	-6.2	-6.7	-6.5	-6.1	-5.9	-5.4	-5.6	-4.9	-5.4	-4.8	-4.8	-4.8	-5.4	-6.5	-6.9	-5.8	-4.6	-4.6	-5.5	-6.3	-4.9	-3.9	-3.9	-4.3	-4.3	-5.6	-4.0
-9.1	-8.7	-8.0	-8.1	-8.1	-8.5	-9.4	-9.4	-9.9	-10.2	-10.3	-9.9	-9.3	-9.2	-7.9	-7.6	-7.3	-8.6	-9.2	-9.0	-8.2	-9.8	-10.7	-10.0	-8.3	-5.9	-5.4	-7.9	-9.8	-8.7	-8.6	-9.4	-9.9	-9.8	-10.7	-8.4
-10.3	-10.2	-9.8	-10.0	-10.2	-10.7	-11.4	-11.5	-12.0	-11.6	-11.3	-10.6	-10.1	-10.2	-9.3	-9.4	-10.9	-12.9	-13.5	-15.0	-12.6	-13.1	-12.8	-13.0	-12.1	-12.1	-11.2	-11.5	-11.9	-11.0	-11.2	-11.8	-11.9	-11.7	-11.9	-10.8
-11.3	-11.4	-11.4	-11.7	-11.6	-11.9	-11.5	-11.6	-11.4	-11.6	-11.9	-11.2	-10.9	-11.0	-10.7	-10.6	-12.2	-12.6	-13.4	-14.5	-12.5	-12.1	-12.1	-12.1	-11.7	-11.7	-12.7	-12.1	-11.7	-11.9	-11.8	-12.1	-12.3	-11.8	-11.6	-11.8
-11.6	-12.0	-11.8	-11.7	-11.5	-11.5	-11.2	-11.3	-11.0	-11.3	-11.2	-11.7	-11.3	-11.1	-11.2	-10.1	-11.2	-10.4	-11.0	-11.2	-11.2	-10.5	-10.8	-11.1	-11.3	-11.3	-11.5	-11.3	-11.6	-11.3	-11.5	-11.6	-11.7	-11.9	-11.3	-12.2
-11.5	-12.1	-12.1	-12.0	-11.7	-11.5	-11.3	-11.0	-10.7	-10.7	-11.4	-12.8	-12.1	-11.2	-11.3	-10.0	-11.0	-10.3	-10.8	-11.2	-11.5	-10.4	-10.6	-10.8	-11.0	-11.2	-11.6	-11.6	-11.5	-11.5	-11.4	-11.3	-11.2	-11.9	-11.0	-12.4
-10.8	-11.0	-11.0	-11.0	-10.7	-10.7	-10.5	-10.1	-9.7	-9.7	-9.3	-10.8	-11.5	-10.2	-10.2	-9.3	-9.9	-9.5	-10.0	-10.7	-11.6	-10.0	-9.8	-9.7	-10.2	-10.4	-10.6	-11.0	-10.8	-11.2	-11.1	-11.0	-11.0	-11.0	-10.3	-11.5
-6.6	-6.5	-6.9	-7.2	-7.3	-7.7	-8.0	-7.5	-7.2	-7.1	-7.0	-7.1	-7.8	-6.8	-7.2	-6.6	-6.2	-7.4	-7.9	-8.1	-8.3	-7.8	-7.5	-6.6	-6.5	-6.4	-6.6	-7.0	-6.9	-7.1	-6.8	-7.0	-7.2	-7.0	-6.5	-7.0
-2.1	-1.5	-1.9	-1.6	-1.8	-1.9	-2.6	-2.7	-2.6	-2.3	-1.4	-2.2	-2.4	-2.6	-2.1	-1.9	-1.0	-3.4	-3.4	-4.0	-4.6	-5.0	-4.3	-3.4	-2.8	-2.1	-2.2	-2.1	-2.0	-2.2	-2.0	-1.8	-1.7	-2.3	-2.0	-2.1
-0.1	1.0	1.3	1.6	2.0	2.0	1.9	2.0	2.3	2.4	3.1	2.7	2.8	2.5	3.0	2.8	3.6	2.1	2.1	1.4	1.1	1.3	1.6	1.8	2.1	2.2	1.9	1.7	1.6	1.4	1.2	1.1	0.7	0.7	0.6	0.8
2.6	3.2	4.1	4.6	4.8	4.8	4.8	4.8	5.0	5.0	4.9	5.4	5.8	6.3	6.6	6.8	7.1	7.2	7.3	7.7	7.9	7.6	7.5	7.2	7.0	6.7	6.1	5.5	5.2	4.9	4.2	3.8	3.7	3.3	2.8	3.0
7.7	8.0	8.2	8.4	7.9	7.3	7.0	7.1	7.3	7.2	7.2	7.8	8.0	8.7	9.7	10.5	11.6	12.6	12.9	13.2	12.9	12.8	13.2	13.6	12.6	11.5	12.0	12.2	11.7	10.9	10.6	10.5	9.2	8.2	7.7	7.6
10.9	10.5	10.2	10.6	11.1	10.7	9.9	9.5	10.0	10.2	10.6	12.2	12.3	12.9	13.9	15.1	17.4	20.0	21.1	20.9	20.6	21.1	22.2	23.5	20.6	20.3	22.2	21.6	20.8	20.5	19.8	19.0	18.2	16.6	13.6	11.9
13.9	13.7	13.4	13.9	14.2	14.8	15.7	16.9	17.1	17.1	16.3	16.5	17.4	18.4	19.4	20.7	22.3	23.6	24.5	25.2	25.3	26.1	26.7	25.5	25.6	25.1	24.2	22.5	21.4	21.2	21.5	21.2	19.8	18.0	15.6	14.6

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



2.6	2.7	2.8	2.9	3.0	3.1	3.1	3.1	3.1	3.0	2.8	3.0	2.9	2.7	2.6	2.7	2.8	2.8	2.8	2.8	2.8	2.7	2.7	2.7	2.6	2.5	2.4	2.4	2.4	2.4	2.6	2.7	2.7	2.7	2.6	2.6
2.5	2.6	2.7	2.8	3.0	3.2	3.8	3.0	2.8	2.8	2.9	3.1	3.4	3.2	3.4	3.4	3.1	3.2	3.2	3.4	3.2	3.0	2.8	2.7	2.7	2.6	2.6	2.7	3.0	3.1	3.1	2.9	2.7	2.5	2.5	2.5
3.1	3.2	3.6	3.5	3.4	3.7	3.9	3.6	3.5	3.4	3.5	3.4	3.3	3.6	4.1	3.6	3.5	3.6	4.0	4.3	4.3	4.3	3.7	3.7	3.6	3.6	3.9	4.1	4.2	4.4	4.4	4.0	3.7	3.7	3.5	3.5
3.5	3.6	3.6	3.2	3.4	3.6	4.1	4.7	4.8	4.6	4.7	4.4	3.8	3.6	3.5	3.2	3.3	3.3	3.5	4.0	4.2	4.4	4.1	3.9	4.1	4.1	4.0	4.4	4.7	4.8	4.0	3.8	3.4	3.5	3.6	3.2
4.1	4.1	3.7	3.6	3.7	4.3	3.9	4.6	4.9	4.5	4.3	3.9	3.9	4.0	3.4	3.2	3.3	3.4	3.6	4.3	4.0	3.9	3.7	3.6	3.6	3.5	3.8	4.3	5.1	4.7	4.1	4.2	3.8	4.1	3.7	3.8
3.5	3.5	3.5	3.4	3.5	3.4	4.0	3.8	3.7	3.5	3.3	3.4	3.5	3.5	3.5	3.4	3.5	3.8	4.2	4.1	4.0	4.0	4.3	3.6	3.8	4.9	3.9	4.8	4.6	4.5	4.4	3.8	3.8	3.8	3.2	3.6
3.5	3.3	3.4	3.3	3.3	3.3	3.4	3.3	3.3	3.5	3.5	3.4	3.4	3.3	3.5	3.5	3.8	4.1	4.1	4.8	4.4	3.6	3.7	3.6	3.5	3.4	3.8	3.5	3.8	3.5	3.6	3.4	3.4	3.5	3.2	3.6
3.4	3.4	3.2	3.2	3.3	3.1	3.3	3.3	3.4	3.3	3.3	3.4	3.4	3.3	3.3	3.5	3.4	3.9	3.7	4.5	4.1	3.7	3.5	3.3	3.3	3.4	3.3	3.2	3.4	3.3	3.4	3.3	3.3	3.5	3.5	3.4
3.4	3.3	3.3	3.3	3.2	3.1	3.3	3.2	3.3	3.2	3.3	3.6	3.4	3.3	3.2	3.5	3.0	3.4	3.1	3.5	3.5	3.4	3.4	3.3	3.4	3.3	3.3	3.4	3.3	3.4	3.3	3.3	3.3	3.4	3.4	3.2
3.4	3.3	3.3	3.3	3.2	3.2	3.1	3.1	3.1	3.1	3.5	3.8	3.6	3.5	3.1	3.4	3.0	3.3	3.0	3.7	3.6	3.5	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.2	3.6	3.2
3.5	3.5	3.3	3.4	3.3	3.4	3.1	3.2	3.2	3.2	3.6	4.5	3.8	3.6	3.2	3.4	3.2	3.3	3.0	4.0	4.3	3.7	3.4	3.4	3.3	3.3	3.3	3.3	3.2	3.2	3.2	3.3	3.4	3.2	3.2	3.5	3.1
3.8	3.9	3.7	3.9	3.6	3.7	3.4	3.5	3.5	3.5	3.4	5.1	4.2	3.5	3.6	3.6	3.8	3.4	3.3	4.0	4.8	3.6	3.6	3.5	3.6	3.6	3.5	3.4	3.5	3.8	3.9	4.2	4.0	3.9	3.8	3.6
3.2	3.7	3.8	3.7	3.6	3.7	3.7	3.9	4.1	3.8	3.9	4.2	4.0	3.8	4.1	3.9	3.9	3.5	3.7	3.7	3.8	3.8	3.5	3.3	3.4	3.4	3.5	3.4	3.5	3.4	3.6	3.8	3.6	3.5	3.4	3.4
3.2	3.2	3.4	3.1	3.3	3.5	3.6	3.6	3.6	3.5	3.6	3.5	3.5	3.7	3.7	3.7	3.6	3.4	3.8	3.6	3.7	4.2	4.2	4.1	3.9	3.6	3.6	3.5	3.4	3.3	3.0	2.9	3.1	3.1	3.1	3.4
3.1	3.2	3.3	3.5	3.4	3.3	3.5	3.4	3.1	3.0	3.1	3.4	3.2	3.0	3.1	3.4	3.1	3.3	4.1	4.3	3.6	3.4	3.6	3.7	3.2	3.1	3.2	3.1	2.8	2.9	3.2	3.0	2.8	3.0	3.0	2.9
4.1	4.2	4.1	4.0	3.8	3.6	3.3	3.4	3.2	3.1	3.1	3.5	3.4	3.4	3.4	3.7	3.6	3.6	3.7	3.5	3.4	3.5	4.1	4.6	3.9	3.4	4.3	4.8	4.9	4.6	4.9	5.1	4.3	3.8	3.7	3.9
3.9	4.0	4.2	4.3	4.4	4.2	3.9	3.6	3.7	3.7	3.4	3.0	3.2	3.3	3.6	3.8	4.2	4.4	4.3	4.3	4.9	4.0	3.2	2.9	3.6	3.7	3.4	3.0	3.3	3.7	4.1	4.8	4.9	4.5	3.8	3.7
4.2	4.4	4.7	4.8	4.7	4.6	4.6	4.7	5.0	4.1	3.9	4.0	4.0	3.9	4.1	4.1	4.0	3.9	3.9	3.9	3.8	3.9	3.8	4.0	3.6	3.7	3.5	3.2	3.3	3.6	4.0	4.2	4.1	4.0	4.2	4.1

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



3.3	3.1	3.1	3.1	3.2	3.2	3.0	3.2	3.2	3.5	3.8	3.4	3.5	3.8	3.8	3.1	2.8	2.9	3.1	3.4	3.6	3.9	4.1	4.2	4.5	4.6	4.8	4.8	4.7	4.5	4.3	4.1	3.9	3.8	3.7	3.5
2.1	1.9	1.9	1.7	1.1	1.3	1.7	1.9	2.0	2.2	2.3	2.3	2.0	5.0	4.7	2.0	-0.8	0.8	1.2	1.8	2.1	2.5	2.8	3.4	3.2	3.1	3.2	3.5	3.5	3.4	3.1	3.2	3.1	2.9	2.5	2.2
1.5	1.0	1.2	1.5	1.2	1.2	0.8	1.3	1.4	1.5	2.0	1.7	1.0	2.6	1.2	0.1	-0.2	-0.2	0.1	0.5	0.7	1.2	1.5	1.8	1.7	1.8	2.3	2.8	2.8	2.5	2.3	2.2	1.2	1.3	1.7	1.5
-0.7	-0.7	-1.1	-0.7	-0.1	0.3	-0.1	-0.2	-0.3	-0.5	-0.6	-0.6	-1.2	-1.3	-1.4	-2.2	-2.1	-2.4	-2.2	-2.1	-1.6	-0.1	-0.4	-0.4	-0.4	-0.4	0.0	0.3	0.6	0.3	-0.2	-0.4	-1.2	-1.3	-1.4	-1.1
-3.5	-2.5	-1.8	-3.9	-4.1	-5.0	-3.8	-3.4	-4.5	-4.9	-5.2	-4.3	-4.0	-3.7	-3.5	-3.4	-2.8	-4.2	-3.9	-2.6	-2.1	-3.2	-4.2	-6.5	-7.6	-6.0	-4.8	-5.3	-4.6	-3.2	-2.8	-3.5	-3.4	-3.0	-3.6	-3.1
-6.0	-5.6	-5.2	-8.9	-9.7	-10.8	-8.5	-6.8	-8.8	-8.5	-7.2	-6.1	-6.2	-4.8	-5.0	-5.4	-5.3	-5.1	-5.4	-5.1	-5.7	-8.7	-12.5	-12.9	-13.8	-6.1	-3.7	-4.2	-5.1	-5.2	-6.4	-6.9	-5.5	-6.6	-7.3	-4.9
-6.3	-6.0	-7.6	-11.2	-13.6	-14.3	-11.3	-8.4	-7.3	-5.3	-5.4	-4.9	-4.4	-4.7	-6.0	-4.8	-3.9	-5.0	-6.6	-7.6	-8.7	-9.1	-11.3	-14.2	-16.1	-11.5	-7.4	-4.4	-5.0	-4.6	-5.8	-6.6	-7.3	-8.1	-7.8	-6.5
-5.3	-6.6	-8.0	-10.8	-11.6	-10.6	-7.1	-3.1	-3.6	-3.5	-4.8	-5.2	-4.3	-5.5	-5.4	-4.6	-6.0	-7.4	-7.0	-5.6	-3.1	-5.5	-9.2	-11.3	-10.0	-5.9	-3.9	-3.6	-4.0	-4.2	-4.2	-4.5	-4.9	-5.1	-4.9	-5.0
-3.8	-4.9	-6.1	-6.7	-7.7	-7.4	-5.9	-5.6	-5.3	-4.4	-3.7	-6.4	-5.6	-6.0	-5.5	-4.8	-6.4	-5.7	-3.4	-2.2	-2.4	-5.3	-6.8	-5.8	-4.2	-3.1	-1.9	-2.2	-2.9	-2.8	-4.5	-4.0	-3.7	-3.7	-3.1	-3.9
-4.7	-7.7	-11.8	-13.9	-14.8	-14.7	-14.2	-13.4	-12.2	-8.9	-6.8	-9.5	-9.4	-11.7	-13.0	-12.3	-12.9	-12.0	-9.4	-4.5	-3.2	-7.0	-7.6	-5.0	-4.1	-4.9	-5.5	-6.1	-8.2	-9.0	-8.3	-6.6	-5.8	-4.3	-2.7	-4.7
-8.1	-8.8	-9.4	-11.3	-13.3	-16.3	-16.8	-16.4	-16.0	-14.0	-9.7	-8.2	-8.2	-8.9	-9.8	-12.3	-13.9	-13.4	-13.0	-10.1	-8.4	-9.3	-9.5	-9.8	-10.2	-10.0	-10.9	-12.4	-13.6	-14.6	-14.2	-13.8	-13.2	-12.1	-10.5	-9.1
-7.8	-7.1	-6.9	-5.7	-5.6	-7.0	-8.8	-9.1	-9.3	-10.0	-11.8	-9.6	-7.9	-5.8	-5.8	-7.1	-8.2	-9.3	-11.0	-12.0	-10.6	-9.6	-8.9	-9.0	-9.7	-10.2	-11.8	-12.4	-13.0	-13.3	-12.0	-9.9	-10.1	-10.4	-9.4	-9.3
-3.9	-3.5	-3.5	-3.6	-3.3	-3.0	-2.1	-1.8	-2.1	-2.5	-2.4	-2.8	-2.7	-2.2	-2.6	-3.3	-1.8	-2.6	-3.2	-5.0	-5.8	-5.5	-4.4	-3.9	-4.5	-4.2	-5.0	-5.5	-6.0	-6.5	-6.1	-5.7	-5.3	-4.4	-2.5	-4.2
-2.0	-1.1	-1.4	-1.2	-0.2	0.4	0.2	-0.1	-0.3	-0.1	1.9	0.1	-0.7	-0.6	-0.2	-0.7	-0.1	-0.8	0.1	0.1	-0.1	0.1	0.3	0.5	0.4	-0.3	-0.6	-0.5	-0.6	-0.4	-0.3	-0.3	-0.4	-0.8	-0.7	-1.0
0.8	1.0	1.3	1.3	1.7	1.9	2.2	1.8	1.6	1.7	1.4	1.5	1.3	1.2	1.6	1.8	2.8	3.1	3.5	3.4	3.1	3.0	2.9	2.8	2.8	2.4	2.0	1.9	1.6	1.7	1.3	1.1	1.2	0.8	0.8	1.2
3.8	3.7	3.8	3.7	3.2	3.3	3.1	3.1	2.6	2.5	2.7	2.9	3.1	3.7	4.3	5.2	6.1	6.8	7.0	7.1	6.9	7.0	8.1	9.1	7.7	6.4	7.7	8.8	8.9	7.4	7.5	8.1	5.9	4.3	4.0	4.2
6.2	5.4	5.0	5.5	6.3	6.1	5.6	5.0	5.2	5.2	5.7	6.9	6.8	7.2	7.8	9.8	13.9	19.0	20.9	20.3	19.2	20.5	24.0	27.7	20.4	20.3	25.2	26.4	28.0	27.0	27.0	27.2	23.1	18.5	10.8	7.4
10.0	9.4	9.2	9.8	10.0	10.7	12.1	14.7	15.0	14.1	13.1	13.3	15.1	16.8	18.7	21.1	24.1	26.9	29.0	30.4	31.0	32.6	34.0	32.8	33.0	32.8	32.2	31.2	32.5	31.3	29.5	27.4	23.5	18.5	12.7	10.9

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations

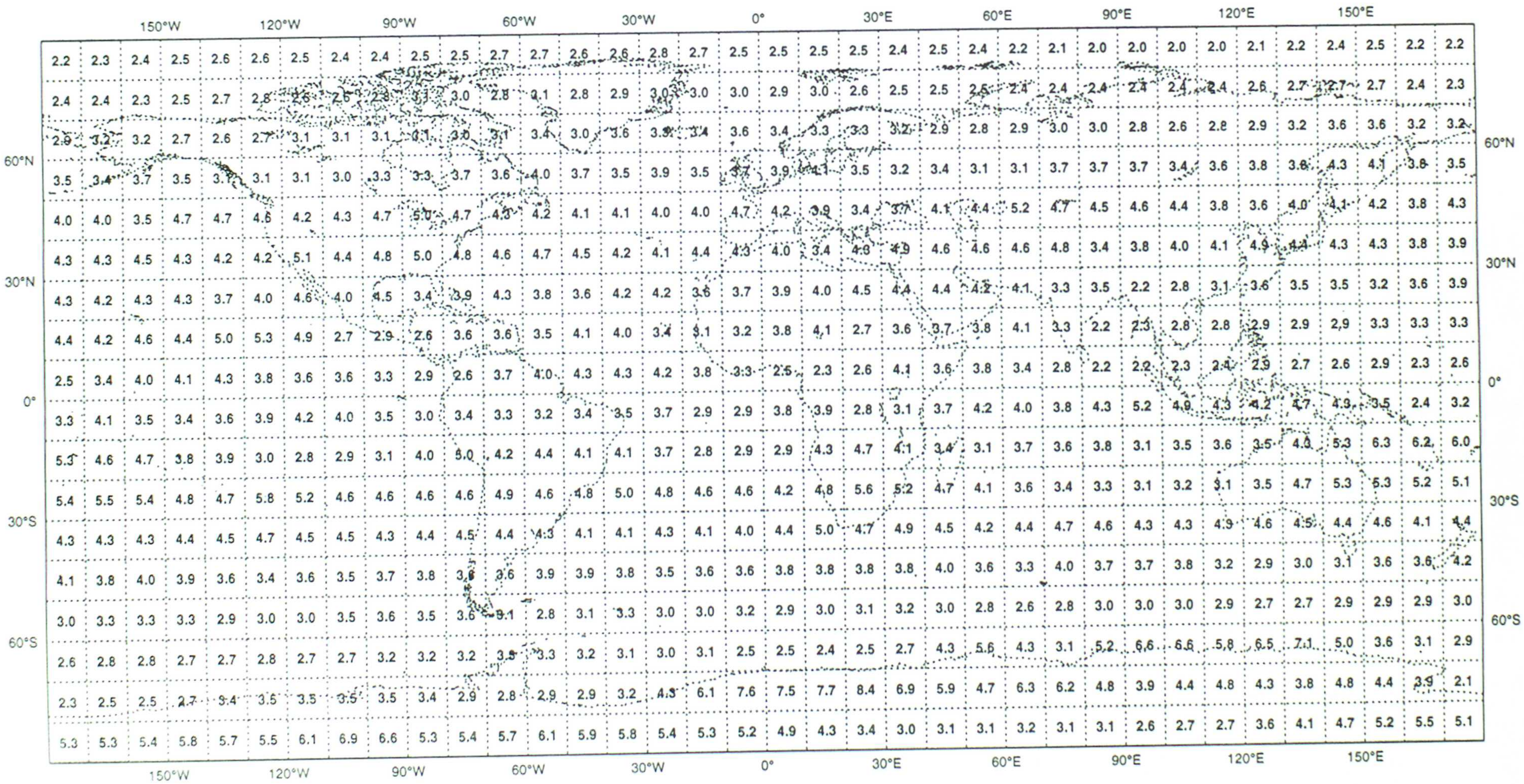

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
2.2 2.3 2.4 2.5 2.6 2.6 2.5 2.4 2.4 2.5 2.5 2.7 2.7 2.6 2.6 2.8 2.7 2.5 2.5 2.5 2.5 2.4 2.5 2.4 2.2 2.1 2.0 2.0 2.0 2.0 2.1 2.2 2.4 2.5 2.2 2.2
2.4 2.4 2.3 2.5 2.7 2.8 2.6 2.6 2.8 3.1 3.0 2.8 3.1 2.8 2.9 3.0 3.0 3.0 2.9 3.0 2.6 2.5 2.5 2.5 2.4 2.4 2.4 2.4 2.4 2.4 2.6 2.7 2.7 2.7 2.4 2.3
2.9 3.2 3.2 2.7 2.6 2.7 3.1 3.1 3.1 3.1 3.0 3.1 3.4 3.0 3.6 3.9 3.4 3.6 3.4 3.3 3.3 3.2 2.9 2.8 2.9 3.0 3.0 2.8 2.6 2.8 2.9 3.2 3.6 3.6 3.2 3.2
3.5 3.4 3.7 3.5 3.7 3.1 3.1 3.0 3.3 3.3 3.7 3.6 4.0 3.7 3.5 3.9 3.5 3.7 3.9 4.1 3.5 3.2 3.4 3.1 3.1 3.7 3.7 3.7 3.4 3.6 3.8 3.8 4.3 4.1 3.8 3.5
4.0 4.0 3.5 4.7 4.7 4.6 4.2 4.3 4.7 5.0 4.7 4.3 4.2 4.1 4.1 4.0 4.0 4.7 4.2 3.9 3.4 3.7 4.1 4.4 5.2 4.7 4.5 4.6 4.4 3.8 3.6 4.0 4.1 4.2 3.8 4.3
4.3 4.3 4.5 4.3 4.2 4.2 5.1 4.4 4.8 5.0 4.8 4.6 4.7 4.5 4.2 4.1 4.4 4.3 4.0 3.4 4.8 4.9 4.6 4.6 4.6 4.8 3.4 3.8 4.0 4.1 4.9 4.4 4.3 4.3 3.8 3.9
4.3 4.2 4.3 4.3 3.7 4.0 4.6 4.0 4.5 3.4 3.9 4.3 3.8 3.6 4.2 4.2 3.6 3.7 3.9 4.0 4.5 4.4 4.4 4.2 4.1 3.3 3.5 2.2 2.8 3.1 3.6 3.5 3.5 3.2 3.6 3.9
4.4 4.2 4.6 4.4 5.0 5.3 4.9 2.7 2.9 2.6 3.6 3.6 3.5 4.1 4.0 3.4 3.1 3.2 3.8 4.1 2.7 3.6 3.7 3.8 4.1 3.3 2.2 2.3 2.8 2.8 2.9 2.9 2.9 3.3 3.3 3.3
2.5 3.4 4.0 4.1 4.3 3.8 3.6 3.6 3.3 2.9 2.6 3.7 4.0 4.3 4.3 4.2 3.8 3.3 2.5 2.3 2.6 4.1 3.6 3.8 3.4 2.8 2.2 2.2 2.3 2.4 2.9 2.7 2.6 2.9 2.3 2.6
3.3 4.1 3.5 3.4 3.6 3.9 4.2 4.0 3.5 3.0 3.4 3.3 3.2 3.4 3.5 3.7 2.9 2.9 3.8 3.9 2.8 3.1 3.7 4.2 4.0 3.8 4.3 5.2 4.9 4.3 4.2 4.7 4.3 3.5 2.4 3.2
5.3 4.6 4.7 3.8 3.9 3.0 2.8 2.9 3.1 4.0 5.0 4.2 4.4 4.1 4.1 3.7 2.8 2.9 2.9 4.3 4.7 4.1 3.4 3.1 3.7 3.6 3.8 3.1 3.5 3.6 3.5 4.0 5.3 6.3 6.2 6.0
5.4 5.5 5.4 4.8 4.7 5.8 5.2 4.6 4.6 4.6 4.6 4.9 4.6 4.8 5.0 4.8 4.6 4.6 4.2 4.8 5.6 5.2 4.7 4.1 3.6 3.4 3.3 3.1 3.2 3.1 3.5 4.7 5.3 5.3 5.2 5.1
4.3 4.3 4.3 4.4 4.5 4.7 4.5 4.5 4.3 4.4 4.5 4.4 4.3 4.1 4.1 4.3 4.1 4.0 4.4 5.0 4.7 4.9 4.5 4.2 4.4 4.7 4.6 4.3 4.3 4.9 4.6 4.5 4.4 4.6 4.1 4.4
4.1 3.8 4.0 3.9 3.6 3.4 3.6 3.5 3.7 3.8 3.6 3.6 3.9 3.9 3.8 3.5 3.6 3.6 3.8 3.8 3.8 3.8 4.0 3.6 3.3 4.0 3.7 3.7 3.8 3.2 2.9 3.0 3.1 3.6 3.6 4.2
3.0 3.3 3.3 3.3 2.9 3.0 3.0 3.5 3.6 3.5 3.6 3.1 2.8 3.1 3.3 3.0 3.0 3.2 2.9 3.0 3.1 3.2 3.0 2.8 2.6 2.8 3.0 3.0 3.0 2.9 2.7 2.7 2.9 2.9 2.9 3.0
2.6 2.8 2.8 2.7 2.7 2.8 2.7 2.7 3.2 3.2 3.2 3.5 3.3 3.2 3.1 3.0 3.1 2.5 2.5 2.4 2.5 2.7 4.3 5.6 4.3 3.1 5.2 6.6 6.6 5.8 6.5 7.1 5.0 3.6 3.1 2.9
2.3 2.5 2.5 2.7 3.4 3.5 3.5 3.5 3.5 3.4 2.9 2.8 2.9 2.9 3.2 4.3 6.1 7.6 7.5 7.7 8.4 6.9 5.9 4.7 6.3 6.2 4.8 3.9 4.4 4.8 4.3 3.8 4.8 4.4 3.9 2.1
5.3 5.3 5.4 5.8 5.7 5.5 6.1 6.9 6.6 5.3 5.4 5.7 6.1 5.9 5.8 5.4 5.3 5.2 4.9 4.3 3.4 3.0 3.1 3.1 3.2 3.1 3.1 2.6 2.7 2.7 3.6 4.1 4.7 5.2 5.5 5.1

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

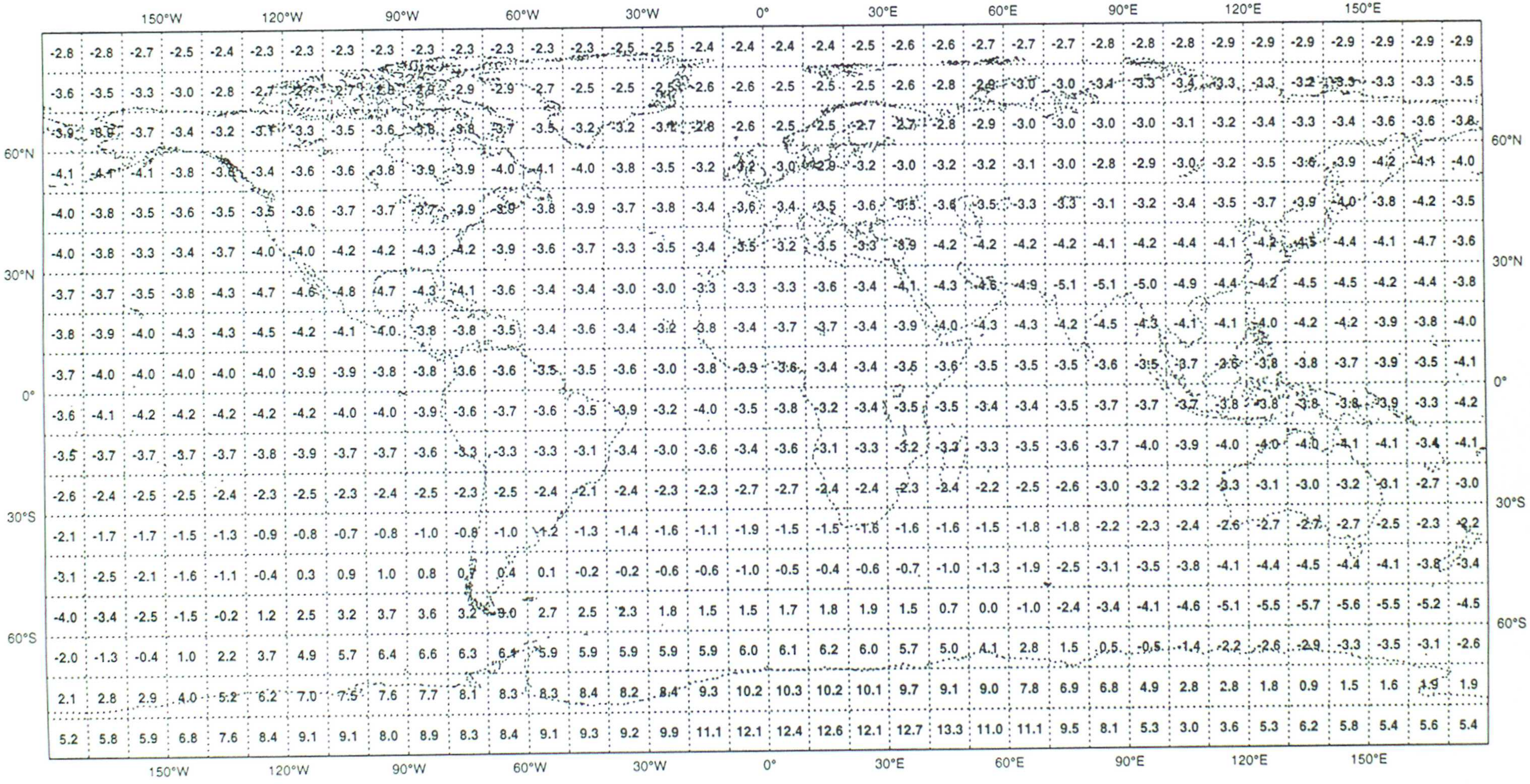
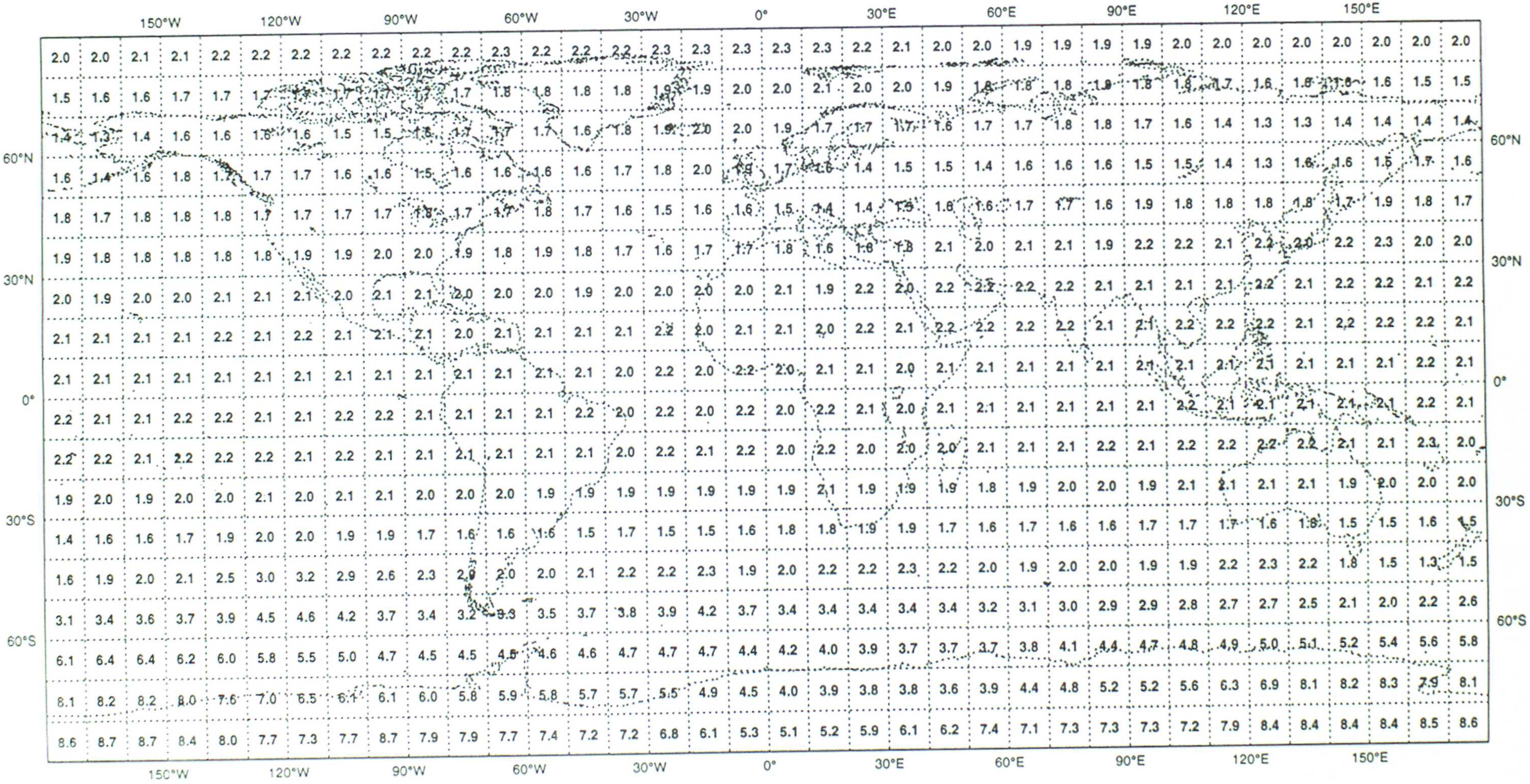
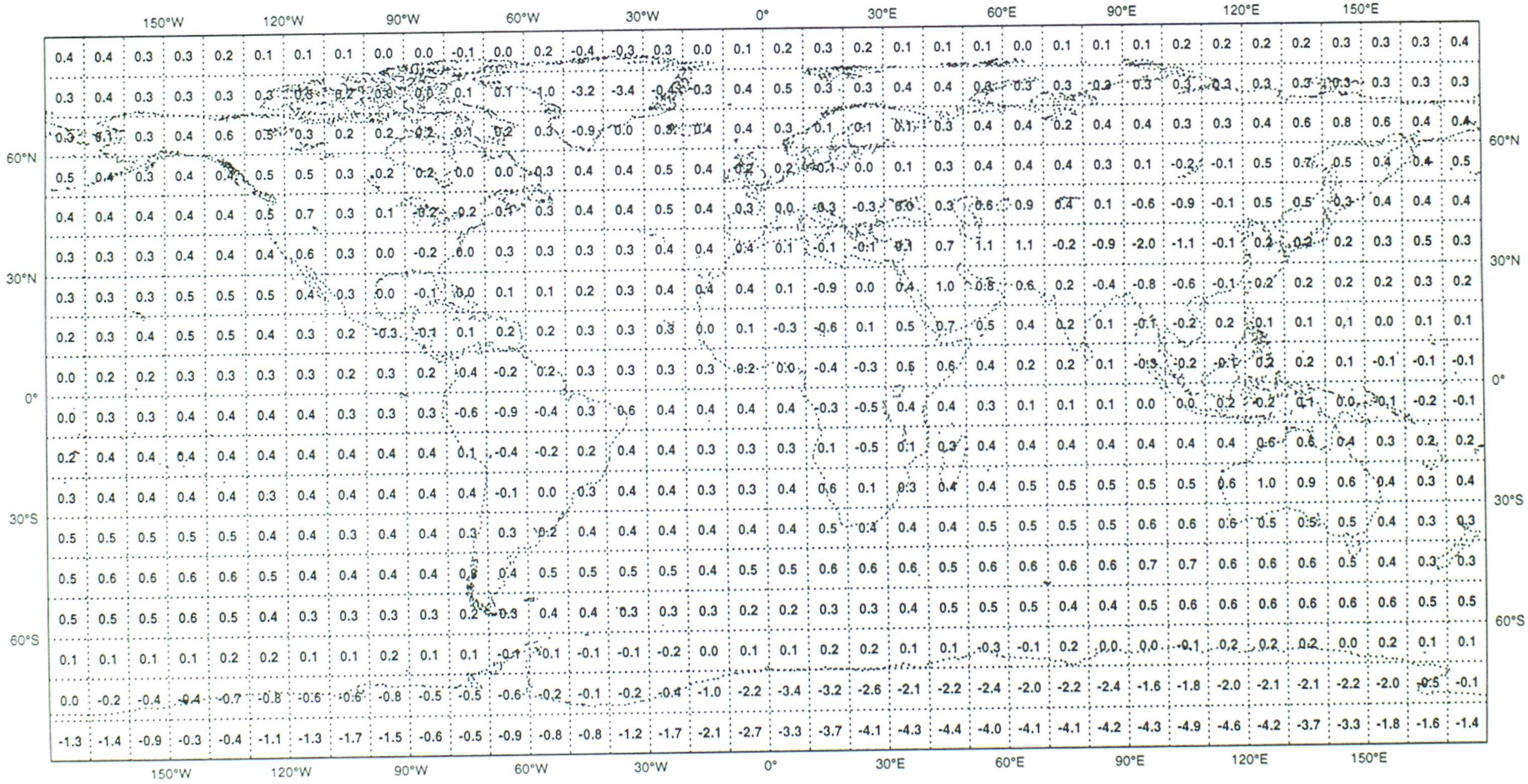

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-2.8 -2.8 -2.7 -2.5 -2.4 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.3 -2.5 -2.5 -2.4 -2.4 -2.4 -2.4 -2.5 -2.6 -2.6 -2.7 -2.7 -2.7 -2.8 -2.8 -2.8 -2.9 -2.9 -2.9 -2.9 -2.9 -2.9 -2.9
-3.6 -3.5 -3.3 -3.0 -2.8 -2.7 -2.7 -2.7 -2.8 -2.8 -2.9 -2.9 -2.7 -2.5 -2.5 -2.5 -2.6 -2.6 -2.5 -2.5 -2.5 -2.6 -2.8 -2.9 -3.0 -3.0 -3.4 -3.3 -3.4 -3.3 -3.3 -3.2 -3.3 -3.3 -3.3 -3.5
-3.9 -3.8 -3.7 -3.4 -3.2 -3.1 -3.3 -3.5 -3.6 -3.8 -3.8 -3.7 -3.5 -3.2 -3.2 -3.1 -2.8 -2.6 -2.5 -2.5 -2.7 -2.7 -2.8 -2.9 -3.0 -3.0 -3.0 -3.0 -3.1 -3.2 -3.4 -3.3 -3.4 -3.6 -3.6 -3.8
-4.1 -4.1 -4.1 -3.8 -3.8 -3.4 -3.6 -3.6 -3.8 -3.9 -3.9 -4.0 -4.1 -4.0 -3.8 -3.5 -3.2 -3.2 -3.0 -2.9 -3.2 -3.0 -3.2 -3.2 -3.1 -3.0 -2.8 -2.9 -3.0 -3.2 -3.5 -3.6 -3.9 -4.2 -4.1 -4.0
-4.0 -3.8 -3.5 -3.6 -3.5 -3.5 -3.6 -3.7 -3.7 -3.7 -3.9 -3.9 -3.8 -3.9 -3.7 -3.8 -3.4 -3.6 -3.4 -3.5 -3.6 -3.5 -3.6 -3.5 -3.3 -3.3 -3.1 -3.2 -3.4 -3.5 -3.7 -3.9 -4.0 -3.8 -4.2 -3.5
-4.0 -3.8 -3.3 -3.4 -3.7 -4.0 -4.0 -4.2 -4.2 -4.3 -4.2 -3.9 -3.6 -3.7 -3.3 -3.5 -3.4 -3.5 -3.2 -3.5 -3.3 -3.9 -4.2 -4.2 -4.2 -4.2 -4.1 -4.2 -4.4 -4.1 -4.2 -4.5 -4.4 -4.1 -4.7 -3.6
-3.7 -3.7 -3.5 -3.8 -4.3 -4.7 -4.6 -4.8 -4.7 -4.3 -4.1 -3.6 -3.4 -3.4 -3.0 -3.0 -3.3 -3.3 -3.3 -3.6 -3.4 -4.1 -4.3 -4.6 -4.9 -5.1 -5.1 -5.0 -4.9 -4.4 -4.2 -4.5 -4.5 -4.2 -4.4 -3.8
-3.8 -3.9 -4.0 -4.3 -4.3 -4.5 -4.2 -4.1 -4.0 -3.8 -3.8 -3.5 -3.4 -3.6 -3.4 -3.2 -3.8 -3.4 -3.7 -3.7 -3.4 -3.9 -4.0 -4.3 -4.3 -4.2 -4.5 -4.3 -4.1 -4.1 -4.0 -4.2 -4.2 -3.9 -3.8 -4.0
-3.7 -4.0 -4.0 -4.0 -4.0 -4.0 -3.9 -3.9 -3.8 -3.8 -3.6 -3.6 -3.5 -3.5 -3.6 -3.0 -3.8 -3.9 -3.6 -3.4 -3.4 -3.5 -3.6 -3.5 -3.5 -3.5 -3.6 -3.5 -3.7 -2.6 -3.8 -3.8 -3.7 -3.9 -3.5 -4.1
-3.6 -4.1 -4.2 -4.2 -4.2 -4.2 -4.2 -4.0 -4.0 -3.9 -3.6 -3.7 -3.6 -3.5 -3.9 -3.2 -4.0 -3.5 -3.8 -3.2 -3.4 -3.5 -3.5 -3.4 -3.4 -3.5 -3.7 -3.7 -3.7 -3.8 -3.8 -3.8 -3.8 -3.9 -3.3 -4.2
-3.5 -3.7 -3.7 -3.7 -3.7 -3.8 -3.9 -3.7 -3.7 -3.6 -3.3 -3.3 -3.3 -3.1 -3.4 -3.0 -3.6 -3.4 -3.6 -3.1 -3.3 -3.2 -3.3 -3.3 -3.5 -3.6 -3.7 -4.0 -3.9 -4.0 -4.0 -4.0 -4.1 -4.1 -3.4 -4.1
-2.6 -2.4 -2.5 -2.5 -2.4 -2.3 -2.5 -2.3 -2.4 -2.5 -2.3 -2.5 -2.4 -2.1 -2.4 -2.3 -2.3 -2.7 -2.7 -2.4 -2.4 -2.3 -2.4 -2.2 -2.5 -2.6 -3.0 -3.2 -3.2 -3.3 -3.1 -3.0 -3.2 -3.1 -2.7 -3.0
-2.1 -1.7 -1.7 -1.5 -1.3 -0.9 -0.8 -0.7 -0.8 -1.0 -0.8 -1.0 -1.2 -1.3 -1.4 -1.6 -1.1 -1.9 -1.5 -1.5 -1.6 -1.6 -1.6 -1.5 -1.8 -1.8 -2.2 -2.3 -2.4 -2.6 -2.7 -2.7 -2.7 -2.5 -2.3 -2.2
-3.1 -2.5 -2.1 -1.6 -1.1 -0.4 0.3 0.9 1.0 0.8 0.7 0.4 0.1 -0.2 -0.2 -0.6 -0.6 -1.0 -0.5 -0.4 -0.6 -0.7 -1.0 -1.3 -1.9 -2.5 -3.1 -3.5 -3.8 -4.1 -4.4 -4.5 -4.4 -4.1 -3.8 -3.4
-4.0 -3.4 -2.5 -1.5 -0.2 1.2 2.5 3.2 3.7 3.6 3.2 3.0 2.7 2.5 2.3 1.8 1.5 1.5 1.7 1.8 1.9 1.5 0.7 0.0 -1.0 -2.4 -3.4 -4.1 -4.6 -5.1 -5.5 -5.7 -5.6 -5.5 -5.2 -4.5
-2.0 -1.3 -0.4 1.0 2.2 3.7 4.9 5.7 6.4 6.6 6.3 6.4 5.9 5.9 5.9 5.9 5.9 6.0 6.1 6.2 6.0 5.7 5.0 4.1 2.8 1.5 0.5 -0.5 -1.4 -2.2 -2.6 -2.9 -3.3 -3.5 -3.1 -2.6
2.1 2.8 2.9 4.0 5.2 6.2 7.0 7.5 7.6 7.7 8.1 8.3 8.3 8.4 8.2 8.4 9.3 10.2 10.3 10.2 10.1 9.7 9.1 9.0 7.8 6.9 6.8 4.9 2.8 2.8 1.8 0.9 1.5 1.6 1.9 1.9
5.2 5.8 5.9 6.8 7.6 8.4 9.1 9.1 8.0 8.9 8.3 8.4 9.1 9.3 9.2 9.9 11.1 12.1 12.4 12.6 12.1 12.7 13.3 11.0 11.1 9.5 8.1 5.3 3.0 3.6 5.3 6.2 5.8 5.4 5.6 5.4

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



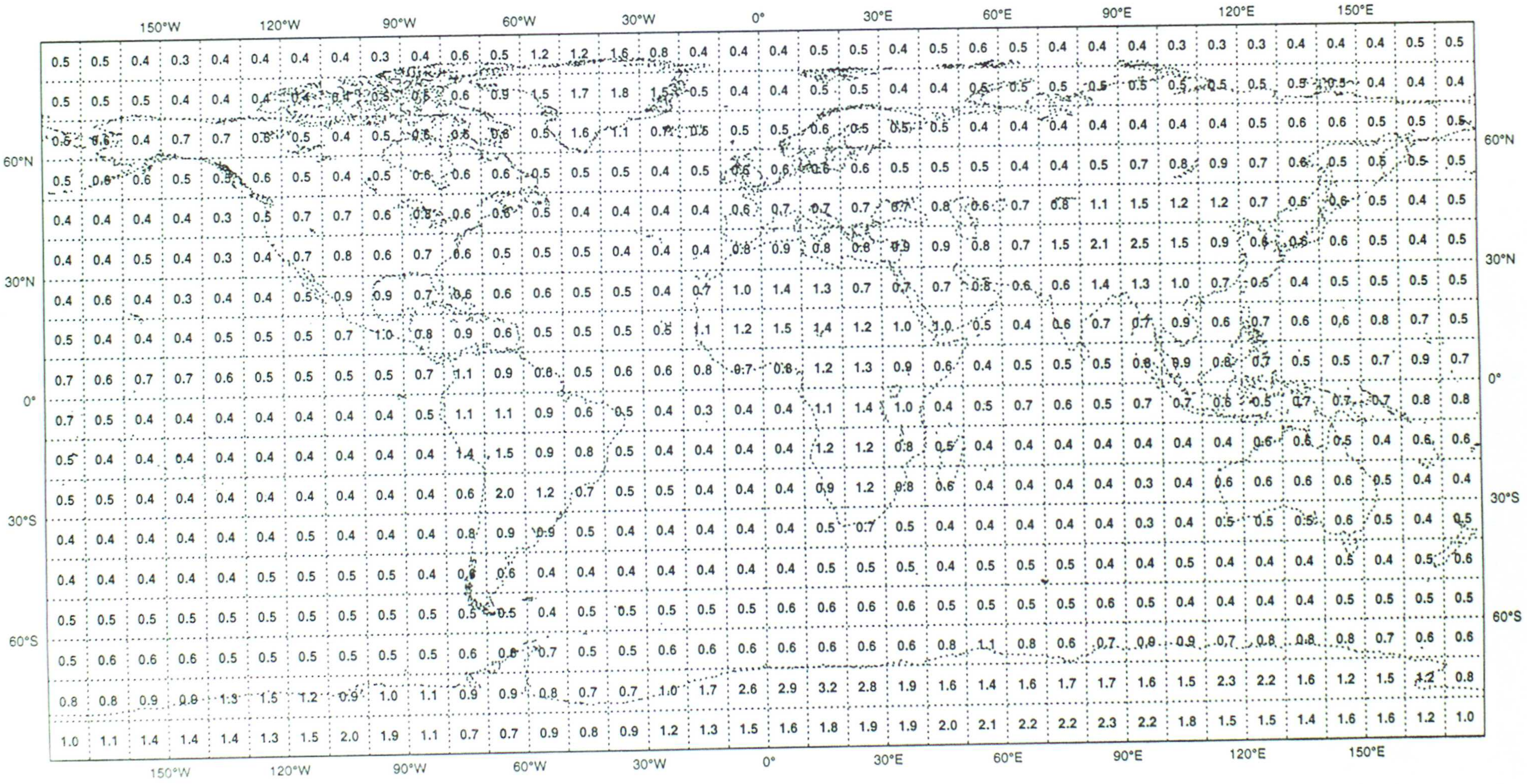
2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.2	2.1	2.0	2.0	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
1.5	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.0	2.0	1.9	1.8	1.8	1.8	1.9	1.8	1.8	1.7	1.6	1.6	1.6	1.6	1.5	1.5
1.4	1.3	1.4	1.6	1.6	1.6	1.6	1.5	1.5	1.6	1.7	1.7	1.7	1.6	1.8	1.9	2.0	2.0	1.9	1.7	1.7	1.7	1.6	1.7	1.7	1.8	1.8	1.7	1.6	1.4	1.3	1.3	1.4	1.4	1.4	1.4
1.6	1.4	1.6	1.8	1.7	1.7	1.7	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.7	1.8	2.0	1.9	1.7	1.6	1.4	1.5	1.5	1.4	1.6	1.6	1.6	1.5	1.5	1.4	1.3	1.6	1.6	1.5	1.7	1.6
1.8	1.7	1.8	1.8	1.8	1.7	1.7	1.7	1.7	1.8	1.7	1.7	1.8	1.7	1.6	1.5	1.6	1.6	1.5	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.6	1.9	1.8	1.8	1.8	1.8	1.7	1.9	1.8	1.7
1.9	1.8	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0	1.9	1.8	1.9	1.8	1.7	1.6	1.7	1.7	1.8	1.6	1.8	1.8	2.1	2.0	2.1	2.1	1.9	2.2	2.2	2.1	2.2	2.0	2.2	2.3	2.0	2.0
2.0	1.9	2.0	2.0	2.1	2.1	2.1	2.0	2.1	2.1	2.0	2.0	2.0	1.9	2.0	2.0	2.0	2.0	2.1	1.9	2.2	2.0	2.2	2.2	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.1	2.2
2.1	2.1	2.1	2.1	2.2	2.1	2.2	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.2	2.0	2.1	2.1	2.0	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.2	2.2	2.2	2.1	2.2	2.2	2.2	2.1
2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.0	2.2	2.0	2.1	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1
2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.2	2.0	2.2	2.0	2.2	2.0	2.2	2.1	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.2	2.1
2.2	2.2	2.1	2.2	2.2	2.2	2.1	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.2	2.1	2.2	2.0	2.2	2.0	2.0	2.0	2.1	2.1	2.1	2.2	2.1	2.2	2.2	2.2	2.2	2.1	2.1	2.3	2.0
1.9	2.0	1.9	2.0	2.0	2.1	2.0	2.1	2.1	2.0	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.1	1.9	1.9	1.9	1.8	1.9	2.0	2.0	1.9	2.1	2.1	2.1	2.1	1.9	2.0	2.0	2.0
1.4	1.6	1.6	1.7	1.9	2.0	2.0	1.9	1.9	1.7	1.6	1.6	1.6	1.5	1.7	1.5	1.5	1.6	1.8	1.8	1.9	1.9	1.7	1.6	1.7	1.6	1.6	1.7	1.7	1.7	1.6	1.8	1.5	1.5	1.6	1.5
1.6	1.9	2.0	2.1	2.5	3.0	3.2	2.9	2.6	2.3	2.9	2.0	2.0	2.1	2.2	2.2	2.3	1.9	2.0	2.2	2.2	2.3	2.2	2.0	1.9	2.0	2.0	1.9	1.9	2.2	2.3	2.2	1.8	1.5	1.3	1.5
3.1	3.4	3.6	3.7	3.9	4.5	4.6	4.2	3.7	3.4	3.2	3.3	3.5	3.7	3.8	3.9	4.2	3.7	3.4	3.4	3.4	3.4	3.4	3.2	3.1	3.0	2.9	2.9	2.8	2.7	2.7	2.5	2.1	2.0	2.2	2.6
6.1	6.4	6.4	6.2	6.0	5.8	5.5	5.0	4.7	4.5	4.5	4.5	4.6	4.6	4.7	4.7	4.7	4.4	4.2	4.0	3.9	3.7	3.7	3.7	3.8	4.1	4.4	4.7	4.8	4.9	5.0	5.1	5.2	5.4	5.6	5.8
8.1	8.2	8.2	8.0	7.6	7.0	6.5	6.1	6.1	6.0	5.8	5.9	5.8	5.7	5.7	5.5	4.9	4.5	4.0	3.9	3.8	3.8	3.6	3.9	4.4	4.8	5.2	5.2	5.6	6.3	6.9	8.1	8.2	8.3	7.9	8.1
8.6	8.7	8.7	8.4	8.0	7.7	7.3	7.7	8.7	7.9	7.9	7.7	7.4	7.2	7.2	6.8	6.1	5.3	5.1	5.2	5.9	6.1	6.2	7.4	7.1	7.3	7.3	7.3	7.2	7.9	8.4	8.4	8.4	8.4	8.5	8.6

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



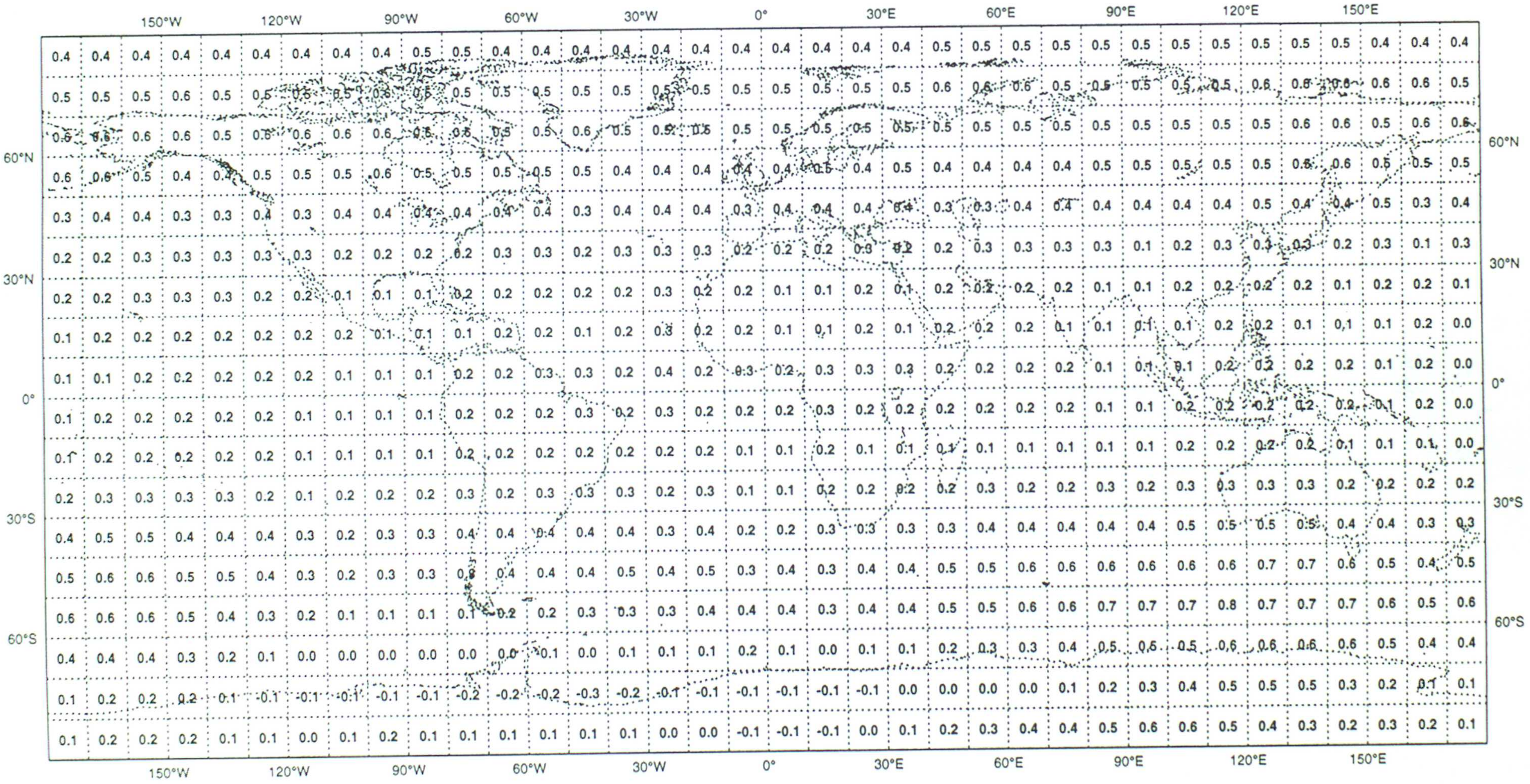
0.4	0.4	0.3	0.3	0.2	0.1	0.1	0.1	0.0	0.0	-0.1	0.0	0.2	-0.4	-0.3	0.3	0.0	0.1	0.2	0.3	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4
0.3	0.4	0.3	0.3	0.3	0.3	0.8	0.2	0.0	0.0	0.1	0.1	-1.0	-3.2	-3.4	-0.4	-0.3	0.4	0.5	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.1	0.3	0.4	0.6	0.5	0.3	0.2	0.2	0.2	0.1	0.2	0.3	-0.9	0.0	0.3	0.4	0.4	0.3	0.1	0.1	0.1	0.3	0.4	0.4	0.2	0.4	0.4	0.3	0.3	0.4	0.6	0.8	0.6	0.4	0.4
0.5	0.4	0.3	0.4	0.4	0.5	0.5	0.3	0.2	0.2	0.0	0.0	-0.3	0.4	0.4	0.5	0.4	0.2	0.2	-0.1	0.0	0.1	0.3	0.4	0.4	0.4	0.3	0.1	-0.2	-0.1	0.5	0.7	0.5	0.4	0.4	0.5
0.4	0.4	0.4	0.4	0.4	0.5	0.7	0.3	0.1	-0.2	-0.2	-0.1	0.3	0.4	0.4	0.5	0.4	0.3	0.0	-0.3	-0.3	0.0	0.3	0.6	0.9	0.4	0.1	-0.6	-0.9	-0.1	0.5	0.5	-0.3	0.4	0.4	0.4
0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.3	0.0	-0.2	0.0	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.1	-0.1	-0.1	0.1	0.7	1.1	1.1	-0.2	-0.9	-2.0	-1.1	-0.1	0.2	0.2	0.2	0.3	0.5	0.3
0.3	0.3	0.3	0.5	0.5	0.5	0.4	0.3	0.0	-0.1	0.0	0.1	0.1	0.2	0.3	0.4	0.4	0.4	0.1	-0.9	0.0	0.4	1.0	0.8	0.6	0.2	-0.4	-0.8	-0.6	-0.1	0.2	0.2	0.2	0.2	0.3	0.2
0.2	0.3	0.4	0.5	0.5	0.4	0.3	0.2	-0.3	-0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.0	0.1	-0.3	-0.6	0.1	0.5	0.7	0.5	0.4	0.2	0.1	-0.1	-0.2	0.2	0.1	0.1	0.1	0.0	0.1	0.1
0.0	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.2	-0.4	-0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.0	-0.4	-0.3	0.5	0.6	0.4	0.2	0.2	0.1	-0.3	-0.2	-0.1	0.2	0.2	0.1	-0.1	-0.1	-0.1
0.0	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	-0.6	-0.9	-0.4	0.3	0.6	0.4	0.4	0.4	0.4	-0.3	-0.5	0.4	0.4	0.3	0.1	0.1	0.1	0.0	0.0	0.2	-0.2	0.1	0.0	-0.1	-0.2	-0.1
0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.1	-0.4	-0.2	0.2	0.4	0.4	0.3	0.3	0.3	0.1	-0.5	0.1	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.4	0.3	0.2	0.2
0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	-0.1	0.0	0.3	0.4	0.4	0.3	0.3	0.4	0.6	0.1	0.3	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	1.0	0.9	0.6	0.4	0.3	0.4
0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.3	0.3
0.5	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.8	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.5	0.4	0.3	0.3
0.5	0.5	0.5	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	-0.1	0.1	-0.1	-0.1	-0.2	0.0	0.1	0.1	0.2	0.2	0.1	0.1	-0.3	-0.1	0.2	0.0	0.0	-0.1	0.2	0.2	0.2	0.0	0.2	0.1	0.1
0.0	-0.2	-0.4	-0.4	-0.7	-0.8	-0.6	-0.6	-0.8	-0.5	-0.5	-0.6	-0.2	-0.1	-0.2	-0.4	-1.0	-2.2	-3.4	-3.2	-2.6	-2.1	-2.2	-2.4	-2.0	-2.2	-2.4	-1.6	-1.8	-2.0	-2.1	-2.1	-2.2	-2.0	-0.5	-0.1
-1.3	-1.4	-0.9	-0.3	-0.4	-1.1	-1.3	-1.7	-1.5	-0.6	-0.5	-0.9	-0.8	-0.8	-1.2	-1.7	-2.1	-2.7	-3.3	-3.7	-4.1	-4.3	-4.4	-4.0	-4.1	-4.1	-4.2	-4.3	-4.9	-4.6	-4.2	-3.7	-3.3	-1.8	-1.6	-1.4

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



0.5	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.6	0.5	1.2	1.2	1.6	0.8	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.6	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5
0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.9	1.5	1.7	1.8	1.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
0.5	0.6	0.4	0.7	0.7	0.6	0.5	0.4	0.5	0.6	0.5	0.8	0.5	1.6	1.1	0.7	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.6	0.5	0.5	0.5
0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.4	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.5	0.7	0.8	0.9	0.7	0.6	0.5	0.5	0.5	0.5
0.4	0.4	0.4	0.4	0.3	0.5	0.7	0.7	0.6	0.8	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.6	0.7	0.7	0.7	0.7	0.8	0.6	0.7	0.8	1.1	1.5	1.2	1.2	0.7	0.6	0.6	0.5	0.4	0.5
0.4	0.4	0.5	0.4	0.3	0.4	0.7	0.8	0.6	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.8	0.9	0.8	0.8	0.9	0.9	0.8	0.7	1.5	2.1	2.5	1.5	0.9	0.6	0.6	0.6	0.5	0.4	0.5
0.4	0.6	0.4	0.3	0.4	0.4	0.5	0.9	0.9	0.7	0.6	0.6	0.6	0.5	0.5	0.4	0.7	1.0	1.4	1.3	0.7	0.7	0.7	0.8	0.6	0.6	1.4	1.3	1.0	0.7	0.5	0.4	0.5	0.5	0.5	0.5
0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.7	1.0	0.8	0.9	0.6	0.5	0.5	0.5	0.5	1.1	1.2	1.5	1.4	1.2	1.0	1.0	0.5	0.4	0.6	0.7	0.7	0.9	0.6	0.7	0.6	0.6	0.8	0.7	0.5
0.7	0.6	0.7	0.7	0.6	0.5	0.5	0.5	0.5	0.7	1.1	0.9	0.8	0.5	0.6	0.6	0.8	0.7	0.8	1.2	1.3	0.9	0.6	0.4	0.5	0.5	0.5	0.8	0.9	0.8	0.7	0.5	0.5	0.7	0.9	0.7
0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	1.1	1.1	0.9	0.6	0.5	0.4	0.3	0.4	0.4	1.1	1.4	1.0	0.4	0.5	0.7	0.6	0.5	0.7	0.7	0.6	0.5	0.7	0.7	0.7	0.8	0.8
0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	1.4	1.5	0.9	0.8	0.5	0.4	0.4	0.4	0.4	1.2	1.2	0.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.6	0.5	0.4	0.6	0.6
0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	2.0	1.2	0.7	0.5	0.5	0.4	0.4	0.4	0.9	1.2	0.8	0.6	0.4	0.4	0.4	0.4	0.3	0.4	0.6	0.6	0.6	0.6	0.5	0.4	0.4
0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.8	0.9	0.9	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.7	0.5	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.5	0.5	0.6	0.5	0.4	0.5
0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.5	0.6
0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.8	1.1	0.8	0.6	0.7	0.9	0.9	0.7	0.8	0.8	0.8	0.7	0.6	0.6
0.8	0.8	0.9	0.8	1.3	1.5	1.2	0.9	1.0	1.1	0.9	0.9	0.8	0.7	0.7	1.0	1.7	2.6	2.9	3.2	2.8	1.9	1.6	1.4	1.6	1.7	1.7	1.6	1.5	2.3	2.2	1.6	1.2	1.5	1.2	0.8
1.0	1.1	1.4	1.4	1.4	1.3	1.5	2.0	1.9	1.1	0.7	0.7	0.9	0.8	0.9	1.2	1.3	1.5	1.6	1.8	1.9	1.9	2.0	2.1	2.2	2.2	2.3	2.2	1.8	1.5	1.5	1.4	1.6	1.6	1.2	1.0

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations



0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5
0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.6
0.6	0.6	0.5	0.4	0.4	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5
0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.3	0.4
0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.3	0.1	0.2	0.3	0.3	0.3	0.2	0.3	0.1	0.3
0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1
0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.2	0.0
0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.4	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.2	0.0
0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.0
0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0
0.2	0.3	0.3	0.3	0.3	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.3	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2
0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3
0.5	0.6	0.6	0.5	0.5	0.4	0.3	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.5	0.3	0.4	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.5	0.4	0.5
0.6	0.6	0.6	0.5	0.4	0.3	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.6	0.5	0.6
0.4	0.4	0.4	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.2	0.1	0.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.4	0.4
0.1	0.2	0.2	0.2	0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.3	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.5	0.5	0.3	0.2	0.1	0.1
0.1	0.2	0.2	0.2	0.1	0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.5	0.4	0.3	0.2	0.3	0.2	0.1

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

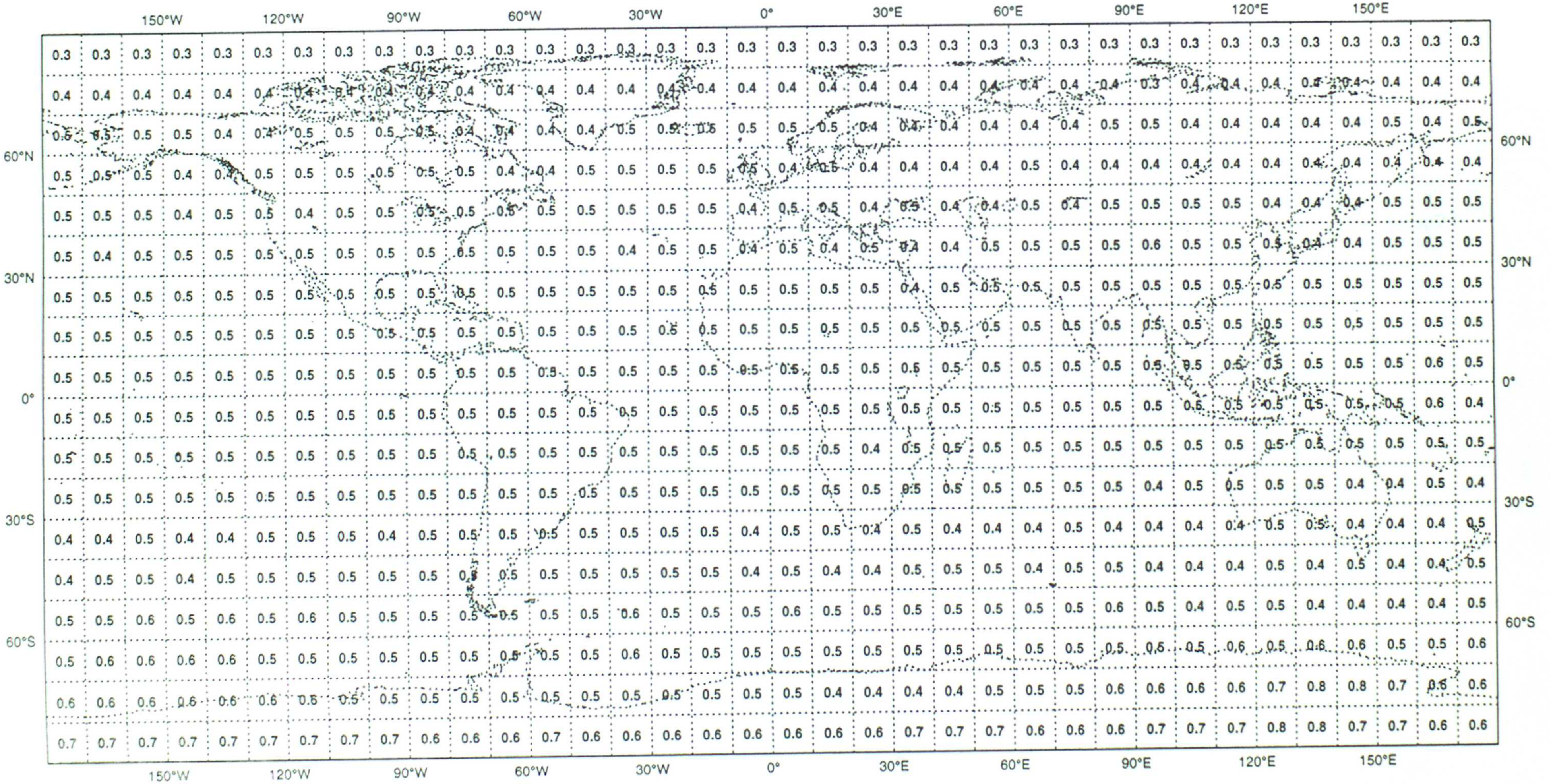

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.5 0.4 0.5
0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.4 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.4 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.5 0.5 0.5
0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.4 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.4
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.4
0.4 0.4 0.5 0.4 0.4 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.5
0.4 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.4 0.4 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.4 0.4 0.5 0.4 0.5 0.4 0.4 0.5
0.5 0.5 0.6 0.5 0.6 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.5
0.5 0.6 0.6 0.6 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.5 0.6 0.6 0.5 0.5 0.6
0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.6 0.6 0.6 0.6 0.7 0.8 0.8 0.7 0.6 0.6
0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.6 0.6 0.6 0.7 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.7 0.7 0.7 0.6 0.6 0.6 0.7 0.7 0.7 0.8 0.8 0.7 0.7 0.6 0.6

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

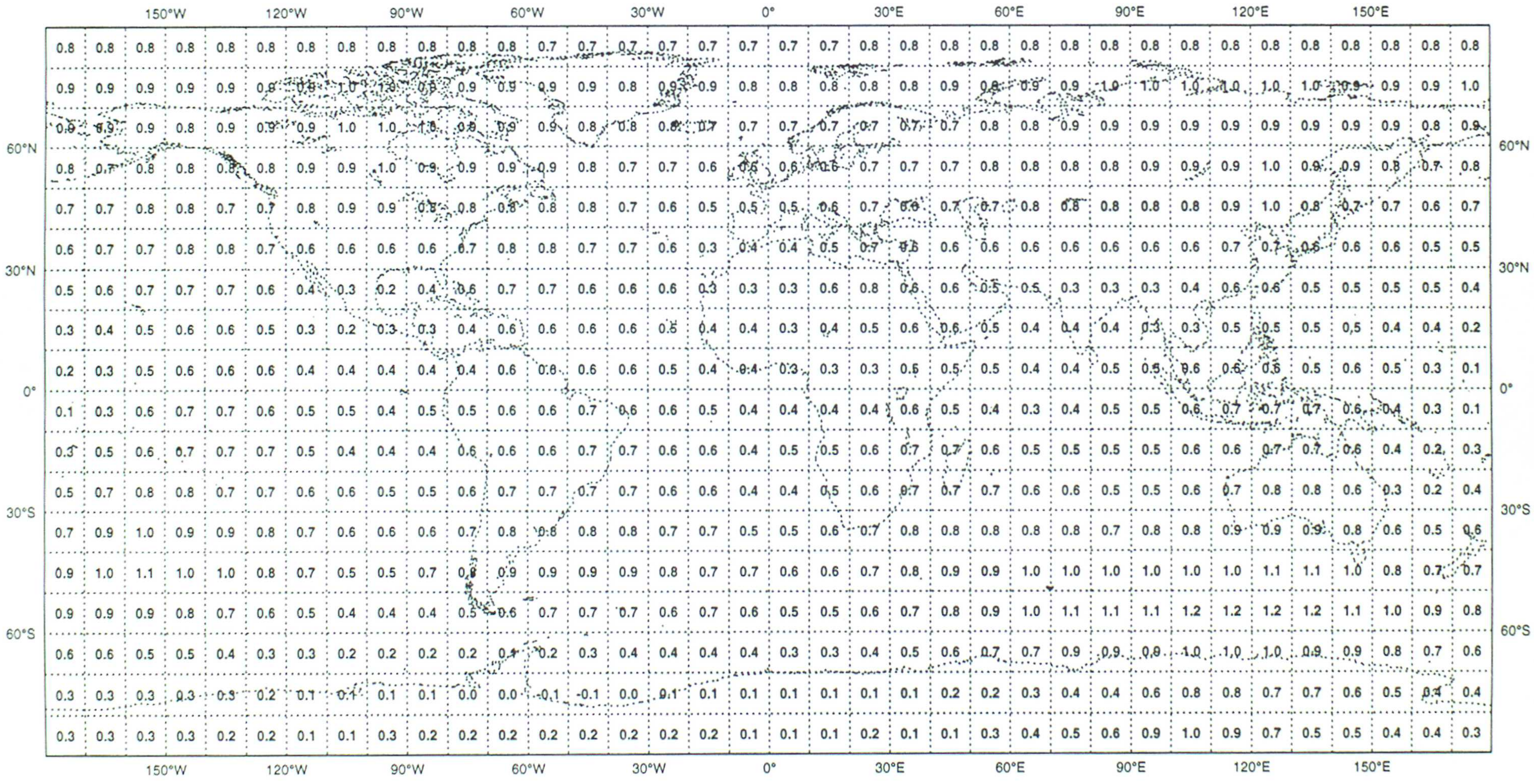
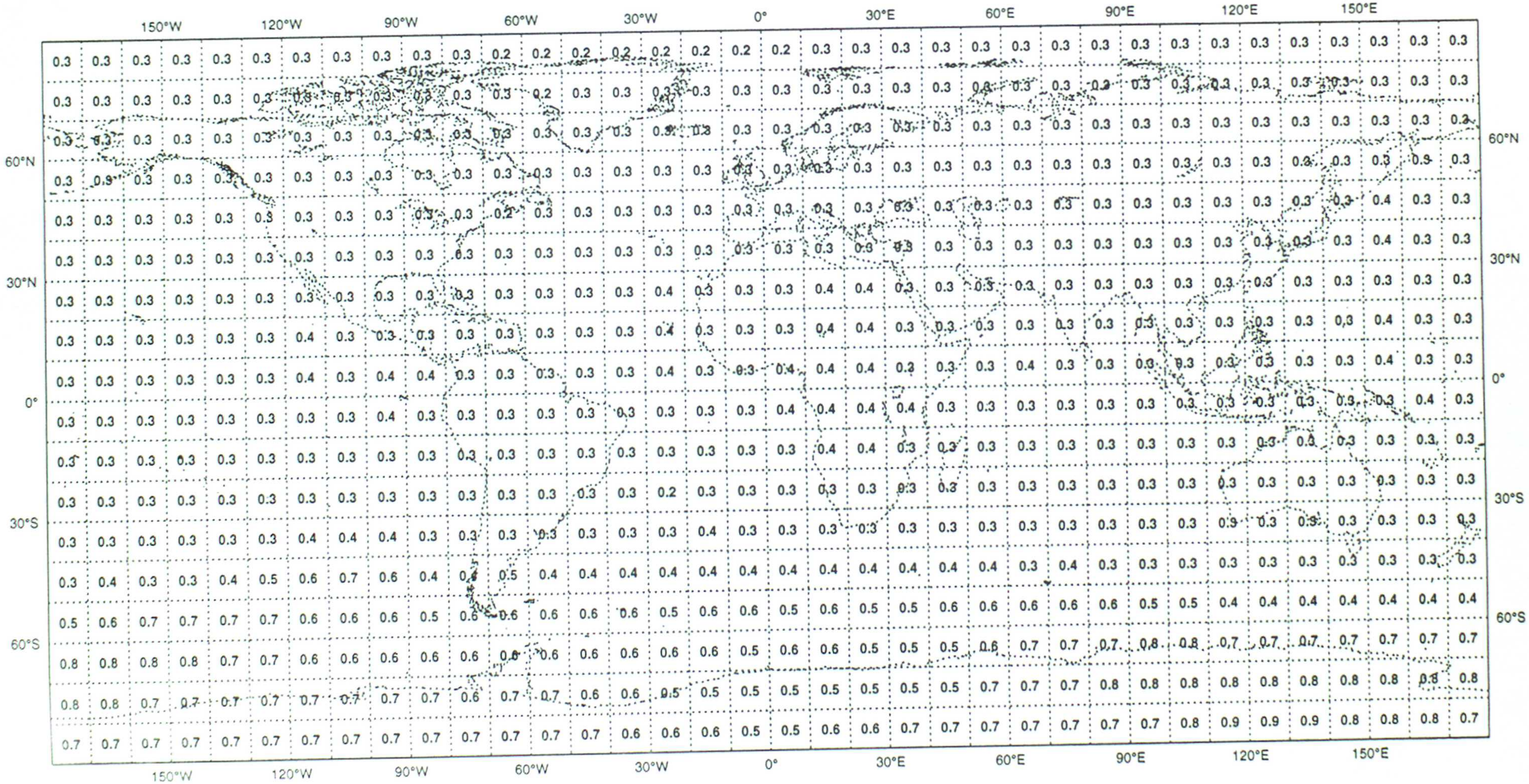
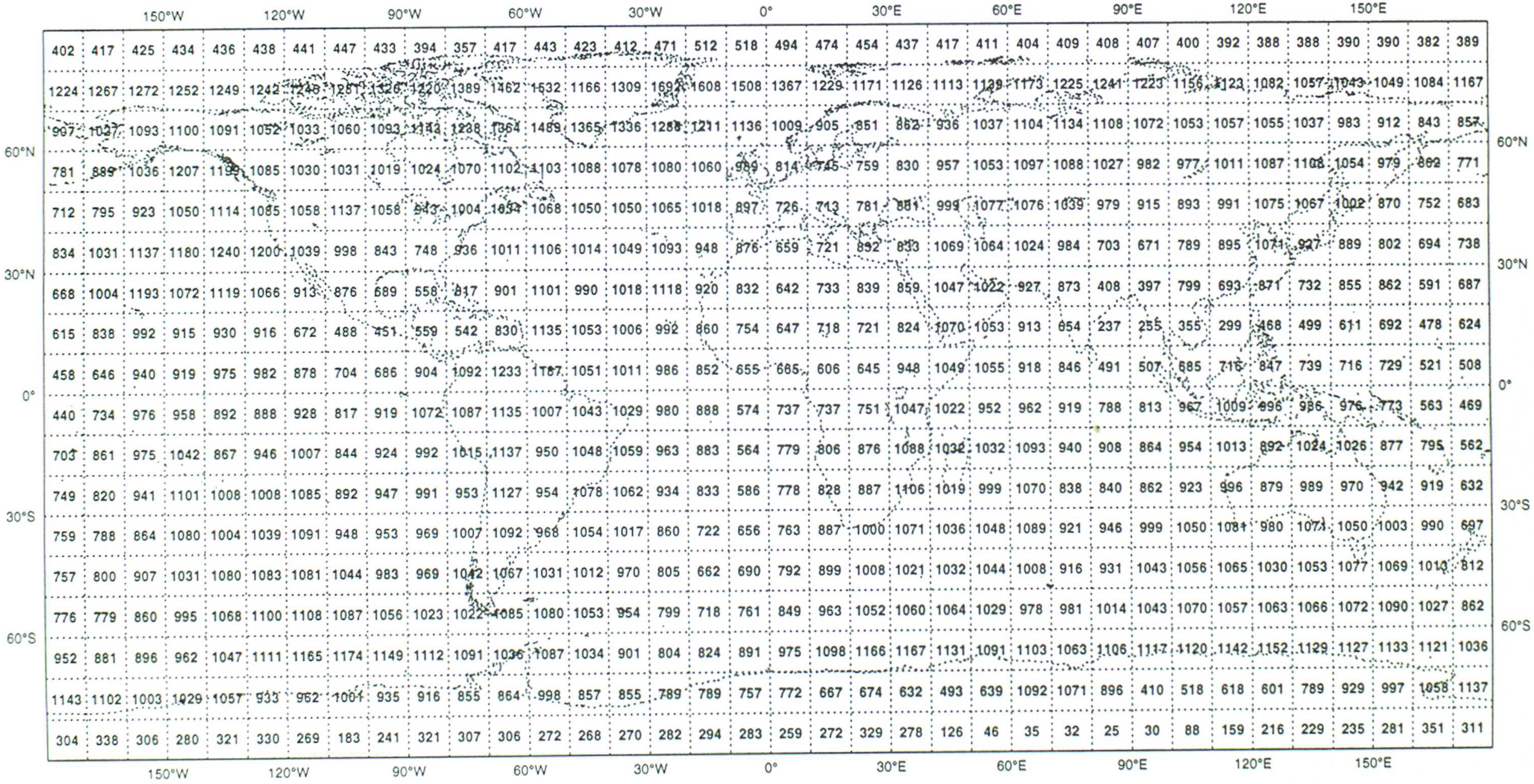

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8
0.9 0.9 0.9 0.9 0.9 0.8 0.8 1.0 1.0 0.8 0.9 0.9 0.9 0.9 0.8 0.9 0.9 0.8 0.8 0.8 0.8 0.8 0.9 0.8 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.9 0.9 0.9 1.0
0.9 0.9 0.9 0.8 0.9 0.9 0.9 1.0 1.0 1.0 0.9 0.9 0.9 0.8 0.8 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.8 0.9
0.8 0.7 0.8 0.8 0.8 0.8 0.9 0.9 1.0 0.9 0.9 0.9 0.9 0.8 0.7 0.7 0.6 0.6 0.6 0.6 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.9 0.9 0.9 1.0 0.9 0.9 0.8 0.7 0.8
0.7 0.7 0.8 0.8 0.7 0.7 0.8 0.9 0.9 0.8 0.8 0.8 0.8 0.8 0.7 0.6 0.5 0.5 0.5 0.6 0.7 0.6 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.9 1.0 0.8 0.7 0.7 0.6 0.7
0.6 0.7 0.7 0.8 0.8 0.7 0.6 0.6 0.6 0.6 0.7 0.8 0.8 0.7 0.7 0.6 0.3 0.4 0.4 0.5 0.7 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.7 0.7 0.6 0.6 0.6 0.5 0.5
0.5 0.6 0.7 0.7 0.7 0.6 0.4 0.3 0.2 0.4 0.6 0.7 0.7 0.6 0.6 0.6 0.3 0.3 0.3 0.6 0.8 0.6 0.6 0.5 0.5 0.3 0.3 0.3 0.4 0.6 0.6 0.5 0.5 0.5 0.5 0.4
0.3 0.4 0.5 0.6 0.6 0.5 0.3 0.2 0.3 0.3 0.4 0.6 0.6 0.6 0.6 0.5 0.4 0.4 0.3 0.4 0.5 0.6 0.6 0.5 0.4 0.4 0.4 0.3 0.3 0.5 0.5 0.5 0.5 0.4 0.4 0.2
0.2 0.3 0.5 0.6 0.6 0.6 0.4 0.4 0.4 0.4 0.4 0.6 0.8 0.6 0.6 0.5 0.4 0.4 0.3 0.3 0.3 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.6 0.6 0.6 0.5 0.6 0.5 0.3 0.1
0.1 0.3 0.6 0.7 0.7 0.6 0.5 0.5 0.4 0.5 0.5 0.6 0.6 0.7 0.6 0.6 0.5 0.4 0.4 0.4 0.4 0.6 0.5 0.4 0.3 0.4 0.5 0.5 0.6 0.7 0.7 0.7 0.6 0.4 0.3 0.1
0.3 0.5 0.6 0.7 0.7 0.7 0.5 0.4 0.4 0.4 0.6 0.6 0.6 0.7 0.7 0.6 0.6 0.4 0.5 0.5 0.6 0.7 0.7 0.6 0.5 0.5 0.5 0.5 0.6 0.6 0.7 0.7 0.6 0.4 0.2 0.3
0.5 0.7 0.8 0.8 0.7 0.7 0.6 0.6 0.5 0.5 0.6 0.7 0.7 0.7 0.7 0.6 0.6 0.4 0.4 0.5 0.6 0.7 0.7 0.7 0.6 0.6 0.5 0.5 0.6 0.7 0.8 0.8 0.6 0.3 0.2 0.4
0.7 0.9 1.0 0.9 0.9 0.8 0.7 0.6 0.6 0.6 0.7 0.8 0.8 0.8 0.8 0.7 0.7 0.5 0.5 0.6 0.7 0.8 0.8 0.8 0.8 0.8 0.7 0.8 0.8 0.9 0.9 0.9 0.8 0.6 0.5 0.6
0.9 1.0 1.1 1.0 1.0 0.8 0.7 0.5 0.5 0.7 0.8 0.9 0.9 0.9 0.9 0.8 0.7 0.7 0.6 0.6 0.7 0.8 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.0 0.8 0.7 0.7
0.9 0.9 0.9 0.8 0.7 0.6 0.5 0.4 0.4 0.4 0.5 0.6 0.7 0.7 0.7 0.6 0.7 0.6 0.5 0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.1 1.1 1.2 1.2 1.2 1.2 1.1 1.0 0.9 0.8
0.6 0.6 0.5 0.5 0.4 0.3 0.3 0.2 0.2 0.2 0.2 0.4 0.2 0.3 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.5 0.6 0.7 0.7 0.9 0.9 0.9 1.0 1.0 1.0 0.9 0.9 0.8 0.7 0.6
0.3 0.3 0.3 0.3 0.3 0.2 0.1 0.1 0.1 0.1 0.0 0.0 -0.1 -0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.3 0.4 0.4 0.6 0.8 0.8 0.7 0.7 0.6 0.5 0.4 0.4
0.3 0.3 0.3 0.3 0.2 0.2 0.1 0.1 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.2 0.1 0.1 0.3 0.4 0.5 0.6 0.9 1.0 0.9 0.7 0.5 0.5 0.4 0.4 0.3
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations



0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.3	0.4	0.3	0.3	0.4	0.5	0.6	0.7	0.6	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.5	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.9	0.8	0.8	0.8	0.7

Figure 40. ATOVS mean daily count. SEPTEMBER 2002
NOAA16, using all observations
Global average number of observations in 24 hours = 570320



402	417	425	434	436	438	441	447	433	394	357	417	443	423	412	471	512	518	494	474	454	437	417	411	404	409	408	407	400	392	388	388	390	390	382	389
1224	1267	1272	1252	1249	1242	1246	1281	1326	1220	1389	1462	1532	1166	1309	1692	1608	1508	1367	1229	1171	1126	1113	1139	1173	1225	1241	1223	1156	1123	1082	1057	1043	1049	1084	1167
997	1027	1093	1100	1091	1052	1033	1060	1093	1142	1238	1364	1489	1365	1336	1288	1211	1136	1009	905	851	862	936	1037	1104	1134	1108	1072	1053	1057	1055	1037	983	912	843	857
781	889	1036	1207	1199	1085	1030	1031	1019	1024	1070	1102	1103	1088	1078	1080	1060	989	814	745	759	830	957	1053	1097	1088	1027	982	977	1011	1087	1108	1054	979	862	771
712	795	923	1050	1114	1085	1058	1137	1058	943	1004	1034	1068	1050	1050	1065	1018	897	726	713	781	881	999	1077	1076	1039	979	915	893	991	1075	1067	1002	870	752	683
834	1031	1137	1180	1240	1200	1039	998	843	748	936	1011	1106	1014	1049	1093	948	876	659	721	892	833	1069	1064	1024	984	703	671	789	895	1071	927	889	802	694	738
668	1004	1193	1072	1119	1066	913	876	689	558	817	901	1101	990	1018	1118	920	832	642	733	839	859	1047	1022	927	873	408	397	799	693	871	732	855	862	591	687
615	838	992	915	930	916	672	488	451	559	542	830	1135	1053	1006	992	860	754	647	718	721	824	1070	1053	913	654	237	255	355	299	468	499	611	692	478	624
458	646	940	919	975	982	878	704	686	904	1092	1233	1187	1051	1011	986	852	655	665	606	645	948	1049	1055	918	846	491	507	685	716	847	739	716	729	521	508
440	734	976	958	892	888	928	817	919	1072	1087	1135	1007	1043	1029	980	888	574	737	737	751	1047	1022	952	962	919	788	813	967	1009	896	986	976	773	563	469
703	861	975	1042	867	946	1007	844	924	992	1015	1137	950	1048	1059	963	883	564	779	806	876	1088	1032	1032	1093	940	908	864	954	1013	892	1024	1026	877	795	562
749	820	941	1101	1008	1008	1085	892	947	991	953	1127	954	1078	1062	934	833	586	778	828	887	1106	1019	999	1070	838	840	862	923	996	879	989	970	942	919	632
759	788	864	1080	1004	1039	1091	948	953	969	1007	1092	968	1054	1017	860	722	656	763	887	1000	1071	1036	1048	1089	921	946	999	1050	1081	980	1071	1050	1003	990	697
757	800	907	1031	1080	1083	1081	1044	983	969	1042	1067	1031	1012	970	805	662	690	792	899	1008	1021	1032	1044	1008	916	931	1043	1056	1065	1030	1053	1077	1069	1010	812
776	779	860	995	1068	1100	1108	1087	1056	1023	1022	1085	1080	1053	954	799	718	761	849	963	1052	1060	1064	1029	978	981	1014	1043	1070	1057	1063	1066	1072	1090	1027	862
952	881	896	962	1047	1111	1165	1174	1149	1112	1091	1036	1087	1034	901	804	824	891	975	1098	1166	1167	1131	1091	1103	1063	1106	1117	1120	1142	1152	1129	1127	1133	1121	1036
1143	1102	1003	1029	1057	933	962	1001	935	916	855	864	998	857	855	789	789	757	772	667	674	632	493	639	1092	1071	896	410	518	618	601	789	929	997	1058	1137
304	338	306	280	321	330	269	183	241	321	307	306	272	268	270	282	294	283	259	272	329	278	126	46	35	32	25	30	88	159	216	229	235	281	351	311

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

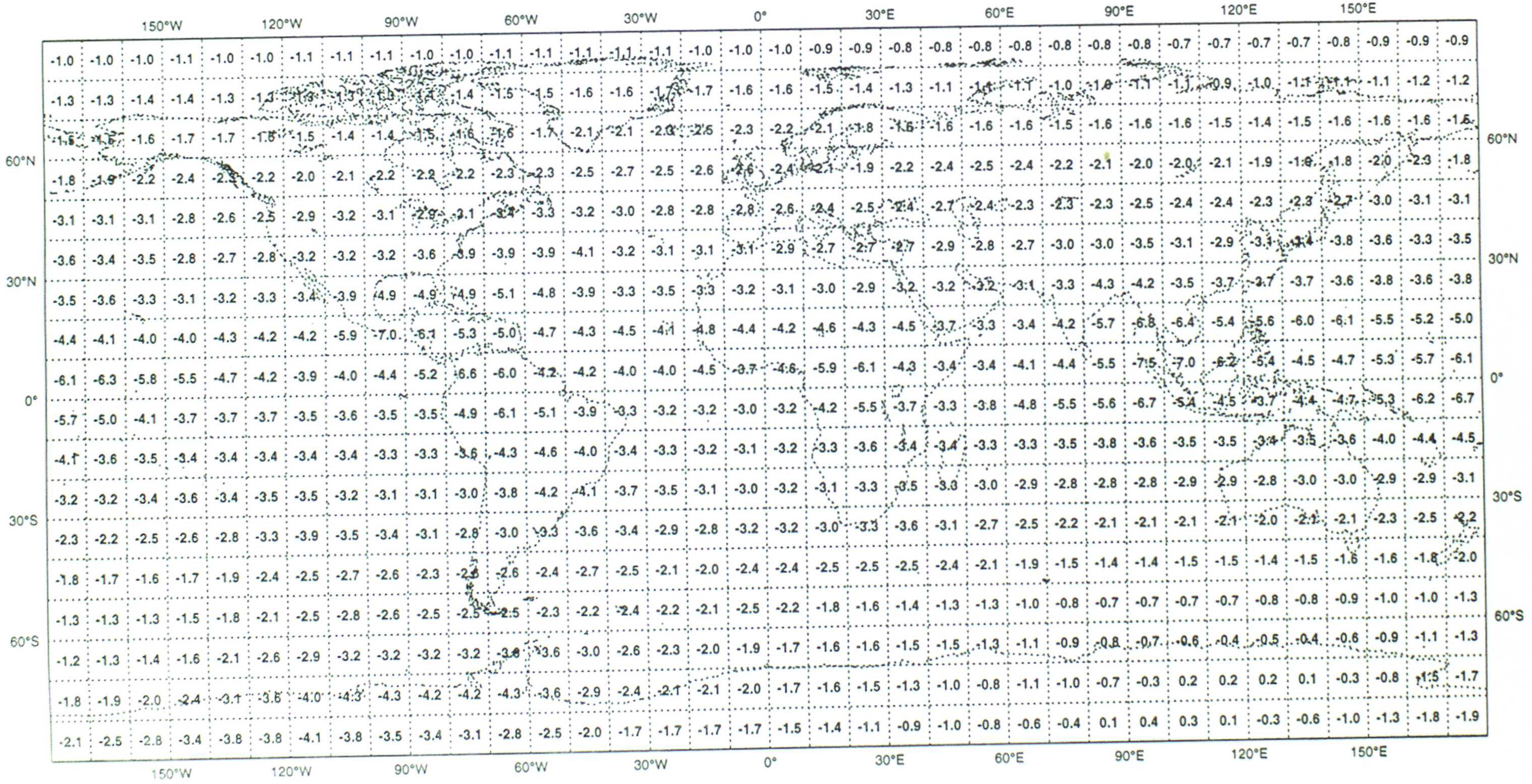

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-1.0 -1.0 -1.0 -1.1 -1.0 -1.0 -1.1 -1.1 -1.1 -1.0 -1.0 -1.1 -1.1 -1.1 -1.1 -1.1 -1.0 -1.0 -1.0 -0.9 -0.9 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.8 -0.7 -0.7 -0.7 -0.7 -0.8 -0.9 -0.9 -0.9
-1.3 -1.3 -1.4 -1.4 -1.3 -1.3 -1.3 -1.3 -1.3 -1.4 -1.4 -1.5 -1.5 -1.6 -1.6 -1.7 -1.7 -1.6 -1.6 -1.5 -1.4 -1.3 -1.1 -1.1 -1.1 -1.0 -1.0 -1.1 -1.1 -0.9 -1.0 -1.1 -1.1 -1.1 -1.2 -1.2
-1.5 -1.6 -1.6 -1.7 -1.7 -1.8 -1.5 -1.4 -1.4 -1.5 -1.6 -1.6 -1.7 -2.1 -2.1 -2.0 -2.6 -2.3 -2.2 -2.1 -1.8 -1.6 -1.6 -1.6 -1.6 -1.5 -1.6 -1.6 -1.6 -1.5 -1.4 -1.5 -1.6 -1.6 -1.6 -1.6
-1.8 -1.9 -2.2 -2.4 -2.3 -2.2 -2.0 -2.1 -2.2 -2.2 -2.2 -2.3 -2.3 -2.5 -2.7 -2.5 -2.6 -2.6 -2.4 -2.1 -1.9 -2.2 -2.4 -2.5 -2.4 -2.2 -2.1 -2.0 -2.0 -2.1 -1.9 -1.8 -1.8 -2.0 -2.3 -1.8
-3.1 -3.1 -3.1 -2.8 -2.6 -2.5 -2.9 -3.2 -3.1 -2.9 -3.1 -3.4 -3.3 -3.2 -3.0 -2.8 -2.8 -2.8 -2.6 -2.4 -2.5 -2.4 -2.7 -2.4 -2.3 -2.3 -2.3 -2.5 -2.4 -2.4 -2.3 -2.3 -2.7 -3.0 -3.1 -3.1
-3.6 -3.4 -3.5 -2.8 -2.7 -2.8 -3.2 -3.2 -3.2 -3.6 -3.9 -3.9 -3.9 -4.1 -3.2 -3.1 -3.1 -3.1 -2.9 -2.7 -2.7 -2.7 -2.9 -2.8 -2.7 -3.0 -3.0 -3.5 -3.1 -2.9 -3.1 -3.4 -3.8 -3.6 -3.3 -3.5
-3.5 -3.6 -3.3 -3.1 -3.2 -3.3 -3.4 -3.9 -4.9 -4.9 -4.9 -5.1 -4.8 -3.9 -3.3 -3.5 -3.3 -3.2 -3.1 -3.0 -2.9 -3.2 -3.2 -3.2 -3.1 -3.3 -4.3 -4.2 -3.5 -3.7 -3.7 -3.7 -3.6 -3.8 -3.6 -3.8
-4.4 -4.1 -4.0 -4.0 -4.3 -4.2 -4.2 -5.9 -7.0 -6.1 -5.3 -5.0 -4.7 -4.3 -4.5 -4.1 -4.8 -4.4 -4.2 -4.6 -4.3 -4.5 -3.7 -3.3 -3.4 -4.2 -5.7 -6.8 -6.4 -5.4 -5.6 -6.0 -6.1 -5.5 -5.2 -5.0
-6.1 -6.3 -5.8 -5.5 -4.7 -4.2 -3.9 -4.0 -4.4 -5.2 -6.6 -6.0 -4.2 -4.2 -4.0 -4.0 -4.5 -3.7 -4.6 -5.9 -6.1 -4.3 -3.4 -3.4 -4.1 -4.4 -5.5 -7.5 -7.0 -6.2 -5.4 -4.5 -4.7 -5.3 -5.7 -6.1
-5.7 -5.0 -4.1 -3.7 -3.7 -3.7 -3.5 -3.6 -3.5 -3.5 -4.9 -6.1 -5.1 -3.9 -3.3 -3.2 -3.2 -3.0 -3.2 -4.2 -5.5 -3.7 -3.3 -3.8 -4.8 -5.5 -5.6 -6.7 -5.4 -4.5 -3.7 -4.4 -4.7 -5.3 -6.2 -6.7
-4.1 -3.6 -3.5 -3.4 -3.4 -3.4 -3.4 -3.4 -3.3 -3.3 -3.6 -4.3 -4.6 -4.0 -3.4 -3.3 -3.2 -3.1 -3.2 -3.3 -3.6 -3.4 -3.4 -3.3 -3.3 -3.5 -3.8 -3.6 -3.5 -3.5 -3.4 -3.5 -3.6 -4.0 -4.4 -4.5
-3.2 -3.2 -3.4 -3.6 -3.4 -3.5 -3.5 -3.2 -3.1 -3.1 -3.0 -3.8 -4.2 -4.1 -3.7 -3.5 -3.1 -3.0 -3.2 -3.1 -3.3 -3.5 -3.3 -3.0 -2.9 -2.8 -2.8 -2.8 -2.9 -2.9 -2.8 -3.0 -3.0 -2.9 -2.9 -3.1
-2.3 -2.2 -2.5 -2.6 -2.8 -3.3 -3.9 -3.5 -3.4 -3.1 -2.8 -3.0 -3.3 -3.6 -3.4 -2.9 -2.8 -3.2 -3.2 -3.0 -3.3 -3.6 -3.1 -2.7 -2.5 -2.2 -2.1 -2.1 -2.1 -2.1 -2.0 -2.1 -2.1 -2.3 -2.5 -2.2
-1.8 -1.7 -1.6 -1.7 -1.9 -2.4 -2.5 -2.7 -2.6 -2.3 -2.3 -2.6 -2.4 -2.7 -2.5 -2.1 -2.0 -2.4 -2.4 -2.5 -2.5 -2.5 -2.4 -2.1 -1.9 -1.5 -1.4 -1.4 -1.5 -1.5 -1.4 -1.5 -1.6 -1.6 -1.8 -2.0
-1.3 -1.3 -1.3 -1.5 -1.8 -2.1 -2.5 -2.8 -2.6 -2.5 -2.5 -2.5 -2.3 -2.2 -2.4 -2.2 -2.1 -2.5 -2.2 -1.8 -1.6 -1.4 -1.3 -1.3 -1.0 -0.8 -0.7 -0.7 -0.7 -0.7 -0.8 -0.8 -0.9 -1.0 -1.0 -1.3
-1.2 -1.3 -1.4 -1.6 -2.1 -2.6 -2.9 -3.2 -3.2 -3.2 -3.2 -3.6 -3.6 -3.0 -2.6 -2.3 -2.0 -1.9 -1.7 -1.6 -1.6 -1.5 -1.5 -1.3 -1.1 -0.9 -0.8 -0.7 -0.6 -0.4 -0.5 -0.4 -0.6 -0.9 -1.1 -1.3
-1.8 -1.9 -2.0 -2.4 -3.1 -3.6 -4.0 -4.3 -4.3 -4.2 -4.2 -4.3 -3.6 -2.9 -2.4 -2.1 -2.1 -2.0 -1.7 -1.6 -1.5 -1.3 -1.0 -0.8 -1.1 -1.0 -0.7 -0.3 0.2 0.2 0.2 0.1 -0.3 -0.8 -1.5 -1.7
-2.1 -2.5 -2.8 -3.4 -3.8 -3.8 -4.1 -3.8 -3.5 -3.4 -3.1 -2.8 -2.5 -2.0 -1.7 -1.7 -1.7 -1.7 -1.5 -1.4 -1.1 -0.9 -1.0 -0.8 -0.6 -0.4 0.1 0.4 0.3 0.1 -0.3 -0.6 -1.0 -1.3 -1.8 -1.9
60°N 30°N 0° 30°S 60°S
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

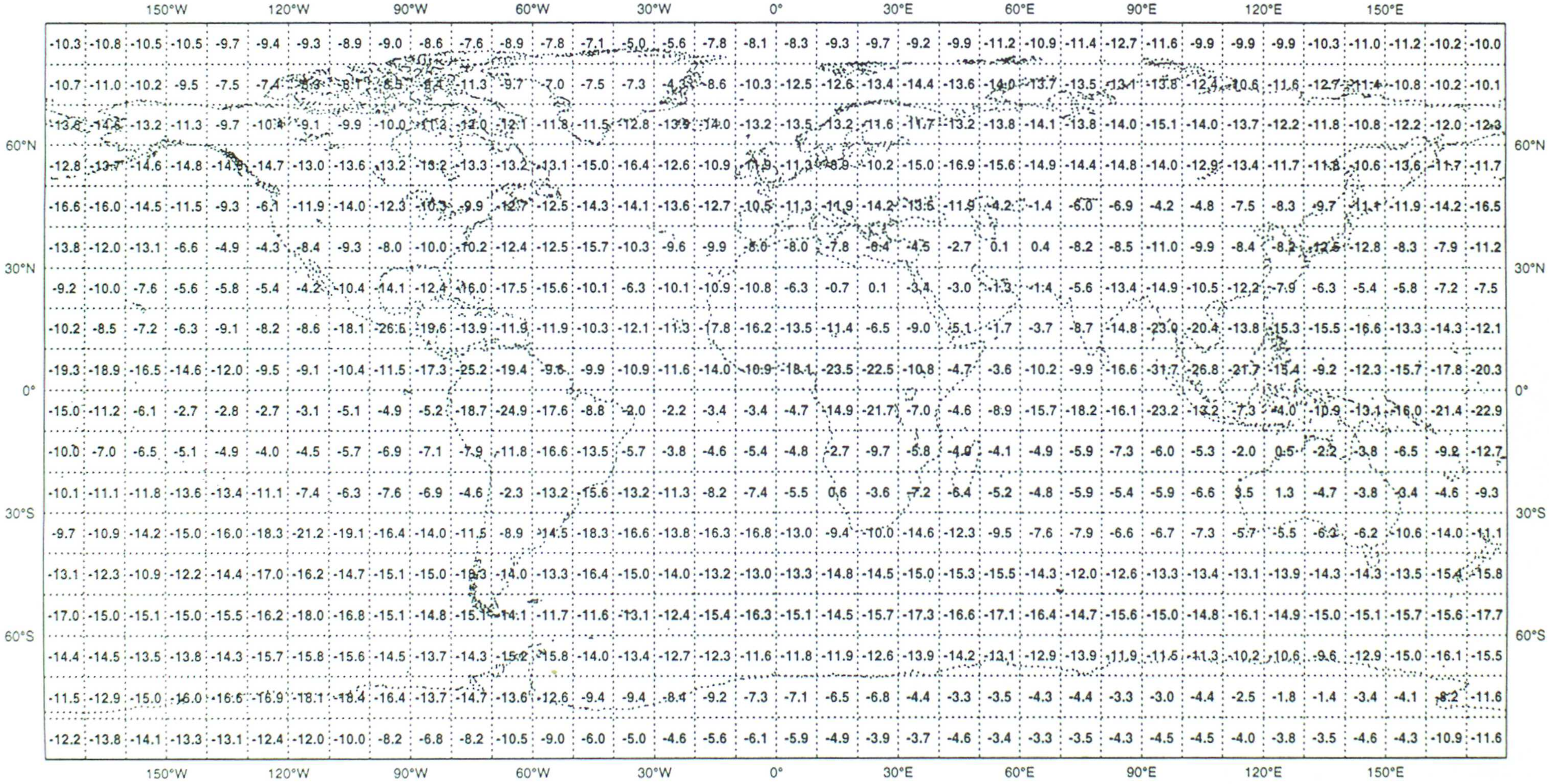
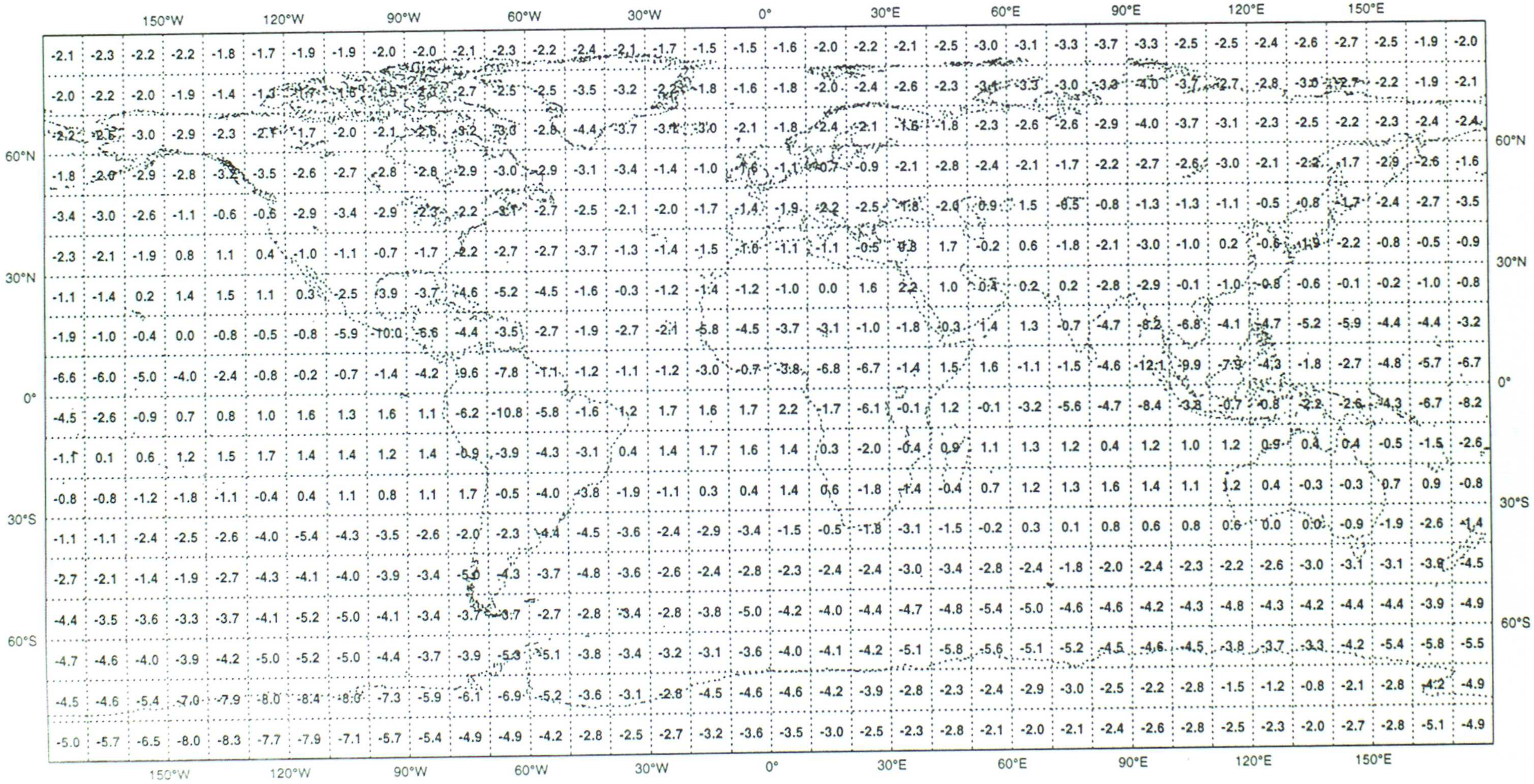
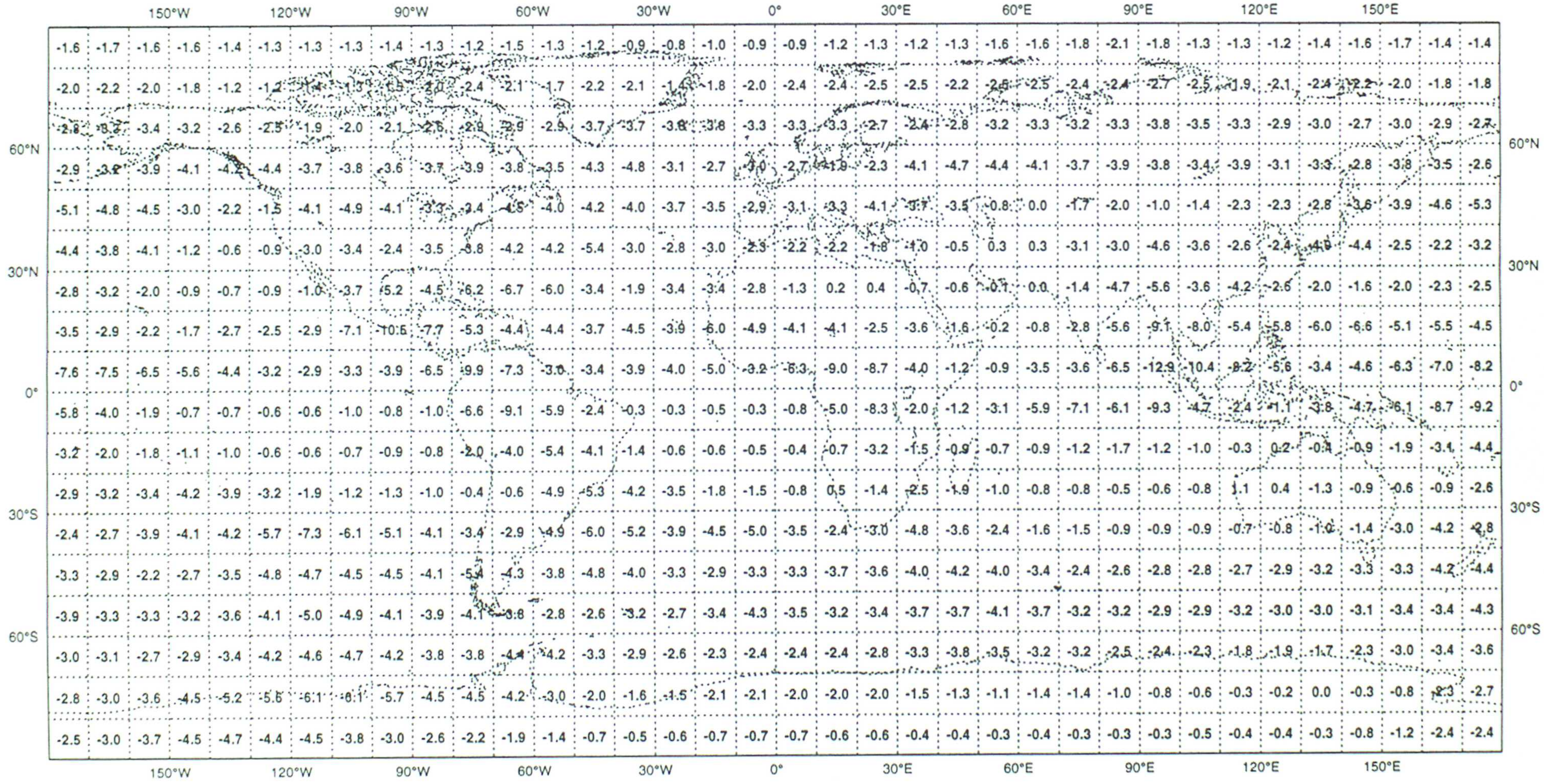

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-10.3 -10.8 -10.5 -10.5 -9.7 -9.4 -9.3 -8.9 -9.0 -8.6 -7.6 -8.9 -7.8 -7.1 -5.0 -5.6 -7.8 -8.1 -8.3 -9.3 -9.7 -9.2 -9.9 -11.2 -10.9 -11.4 -12.7 -11.6 -9.9 -9.9 -9.9 -10.3 -11.0 -11.2 -10.2 -10.0
-10.7 -11.0 -10.2 -9.5 -7.5 -7.4 -8.3 -8.1 -8.5 -8.4 -11.3 -9.7 -7.0 -7.5 -7.3 -4.3 -8.6 -10.3 -12.5 -12.6 -13.4 -14.4 -13.6 -14.0 -13.7 -13.5 -13.1 -13.8 -12.4 -10.6 -11.6 -12.7 -11.4 -10.8 -10.2 -10.1
-13.6 -14.6 -13.2 -11.3 -9.7 -10.4 -9.1 -9.9 -10.0 -11.2 -12.0 -12.1 -11.8 -11.5 -12.8 -13.9 -14.0 -13.2 -13.5 -13.2 -11.6 -11.7 -13.2 -13.8 -14.1 -13.8 -14.0 -15.1 -14.0 -13.7 -12.2 -11.8 -10.8 -12.2 -12.0 -12.3
-12.8 -13.7 -14.6 -14.8 -14.9 -14.7 -13.0 -13.6 -13.2 -13.2 -13.3 -13.2 -13.1 -15.0 -16.4 -12.6 -10.9 -11.9 -11.3 -8.9 -10.2 -15.0 -16.9 -15.6 -14.9 -14.4 -14.8 -14.0 -12.9 -13.4 -11.7 -11.8 -10.6 -13.6 -11.7 -11.7
-16.6 -16.0 -14.5 -11.5 -9.3 -6.1 -11.9 -14.0 -12.3 -10.3 -9.9 -12.7 -12.5 -14.3 -14.1 -13.6 -12.7 -10.5 -11.3 -11.9 -14.2 -13.6 -11.9 -4.2 -1.4 -6.0 -6.9 -4.2 -4.8 -7.5 -8.3 -9.7 -11.1 -11.9 -14.2 -16.5
-13.8 -12.0 -13.1 -6.6 -4.9 -4.3 -8.4 -9.3 -8.0 -10.0 -10.2 -12.4 -12.5 -15.7 -10.3 -9.6 -9.9 -8.0 -8.0 -7.8 -6.4 -4.5 -2.7 0.1 0.4 -8.2 -8.5 -11.0 -9.9 -8.4 -8.2 -12.5 -12.8 -8.3 -7.9 -11.2
-9.2 -10.0 -7.6 -5.6 -5.8 -5.4 -4.2 -10.4 -14.1 -12.4 -16.0 -17.5 -15.6 -10.1 -6.3 -10.1 -10.9 -10.8 -6.3 -0.7 0.1 -3.4 -3.0 -1.3 -1.4 -5.6 -13.4 -14.9 -10.5 -12.2 -7.9 -6.3 -5.4 -5.8 -7.2 -7.5
-10.2 -8.5 -7.2 -6.3 -9.1 -8.2 -8.6 -18.1 -26.5 -19.6 -13.9 -11.9 -11.9 -10.3 -12.1 -11.3 -17.8 -16.2 -13.5 -11.4 -6.5 -9.0 -5.1 -1.7 -3.7 -8.7 -14.8 -23.0 -20.4 -13.8 -15.3 -15.5 -16.6 -13.3 -14.3 -12.1
-19.3 -18.9 -16.5 -14.6 -12.0 -9.5 -9.1 -10.4 -11.5 -17.3 -25.2 -19.4 -9.6 -9.9 -10.9 -11.6 -14.0 -10.9 -18.1 -23.5 -22.5 -10.8 -4.7 -3.6 -10.2 -9.9 -16.6 -31.7 -26.8 -21.7 -15.4 -9.2 -12.3 -15.7 -17.8 -20.3
-15.0 -11.2 -6.1 -2.7 -2.8 -2.7 -3.1 -5.1 -4.9 -5.2 -18.7 -24.9 -17.6 -8.8 -2.0 -2.2 -3.4 -3.4 -4.7 -14.9 -21.7 -7.0 -4.6 -8.9 -15.7 -18.2 -16.1 -23.2 -13.2 -7.3 -4.0 -10.9 -13.1 -16.0 -21.4 -22.9
-10.0 -7.0 -6.5 -5.1 -4.9 -4.0 -4.5 -5.7 -6.9 -7.1 -7.9 -11.8 -16.6 -13.5 -5.7 -3.8 -4.6 -5.4 -4.8 -2.7 -9.7 -5.8 -4.9 -4.1 -4.9 -5.9 -7.3 -6.0 -5.3 -2.0 0.5 -2.2 -3.8 -6.5 -9.2 -12.7
-10.1 -11.1 -11.8 -13.6 -13.4 -11.1 -7.4 -6.3 -7.6 -6.9 -4.6 -2.3 -13.2 -15.6 -13.2 -11.3 -8.2 -7.4 -5.5 0.6 -3.6 -7.2 -6.4 -5.2 -4.8 -5.9 -5.4 -5.9 -6.6 3.5 1.3 -4.7 -3.8 -3.4 -4.6 -9.3
-9.7 -10.9 -14.2 -15.0 -16.0 -18.3 -21.2 -19.1 -16.4 -14.0 -11.5 -8.9 -14.5 -18.3 -16.6 -13.8 -16.3 -16.8 -13.0 -9.4 -10.0 -14.6 -12.3 -9.5 -7.6 -7.9 -6.6 -6.7 -7.3 -5.7 -5.5 -6.3 -6.2 -10.6 -14.0 -11.1
-13.1 -12.3 -10.9 -12.2 -14.4 -17.0 -16.2 -14.7 -15.1 -15.0 -18.3 -14.0 -13.3 -16.4 -15.0 -14.0 -13.2 -13.0 -13.3 -14.8 -14.5 -15.0 -15.3 -15.5 -14.3 -12.0 -12.6 -13.3 -13.4 -13.1 -13.9 -14.3 -14.3 -13.5 -15.4 -15.8
-17.0 -15.0 -15.1 -15.0 -15.5 -16.2 -18.0 -16.8 -15.1 -14.8 -15.1 -14.1 -11.7 -11.6 -13.1 -12.4 -15.4 -16.3 -15.1 -14.5 -15.7 -17.3 -16.6 -17.1 -16.4 -14.7 -15.6 -15.0 -14.8 -16.1 -14.9 -15.0 -15.1 -15.7 -15.6 -17.7
-14.4 -14.5 -13.5 -13.8 -14.3 -15.7 -15.8 -15.6 -14.5 -13.7 -14.3 -15.2 -15.8 -14.0 -13.4 -12.7 -12.3 -11.6 -11.8 -11.9 -12.6 -13.9 -14.2 -13.1 -12.9 -13.9 -11.9 -11.6 -11.3 -10.2 -10.6 -9.6 -12.9 -15.0 -16.1 -15.5
-11.5 -12.9 -15.0 -16.0 -16.6 -16.9 -18.1 -18.4 -16.4 -13.7 -14.7 -13.6 -12.6 -9.4 -9.4 -8.4 -9.2 -7.3 -7.1 -6.5 -6.8 -4.4 -3.3 -3.5 -4.3 -4.4 -3.3 -3.0 -4.4 -2.5 -1.8 -1.4 -3.4 -4.1 -8.2 -11.6
-12.2 -13.8 -14.1 -13.3 -13.1 -12.4 -12.0 -10.0 -8.2 -6.8 -8.2 -10.5 -9.0 -6.0 -5.0 -4.6 -5.6 -6.1 -5.9 -4.9 -3.9 -3.7 -4.6 -3.4 -3.3 -3.5 -4.3 -4.5 -4.5 -4.0 -3.8 -3.5 -4.6 -4.3 -10.9 -11.6

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-2.1	-2.3	-2.2	-2.2	-1.8	-1.7	-1.9	-1.9	-2.0	-2.0	-2.1	-2.3	-2.2	-2.4	-2.1	-1.7	-1.5	-1.5	-1.6	-2.0	-2.2	-2.1	-2.5	-3.0	-3.1	-3.3	-3.7	-3.3	-2.5	-2.5	-2.4	-2.6	-2.7	-2.5	-1.9	-2.0
-2.0	-2.2	-2.0	-1.9	-1.4	-1.3	-1.7	-1.6	-1.5	-2.3	-2.7	-2.5	-2.5	-3.5	-3.2	-2.2	-1.8	-1.6	-1.8	-2.0	-2.4	-2.6	-2.3	-3.4	-3.3	-3.0	-3.8	-4.0	-3.7	-2.7	-2.8	-3.0	-2.7	-2.2	-1.9	-2.1
-2.2	-2.6	-3.0	-2.9	-2.3	-2.1	-1.7	-2.0	-2.1	-2.6	-3.2	-3.0	-2.8	-4.4	-3.7	-3.1	-3.0	-2.1	-1.8	-2.4	-2.1	-1.6	-1.8	-2.3	-2.6	-2.6	-2.9	-4.0	-3.7	-3.1	-2.3	-2.5	-2.2	-2.3	-2.4	-2.4
-1.8	-2.0	-2.9	-2.8	-3.2	-3.5	-2.6	-2.7	-2.8	-2.8	-2.9	-3.0	-2.9	-3.1	-3.4	-1.4	-1.0	-1.6	-1.1	-0.7	-0.9	-2.1	-2.8	-2.4	-2.1	-1.7	-2.2	-2.7	-2.6	-3.0	-2.1	-2.2	-1.7	-2.9	-2.6	-1.6
-3.4	-3.0	-2.6	-1.1	-0.6	-0.6	-2.9	-3.4	-2.9	-2.3	-2.2	-3.1	-2.7	-2.5	-2.1	-2.0	-1.7	-1.4	-1.9	-2.2	-2.5	-1.8	-2.0	0.9	1.5	-6.5	-0.8	-1.3	-1.3	-1.1	-0.5	-0.8	-1.7	-2.4	-2.7	-3.5
-2.3	-2.1	-1.9	0.8	1.1	0.4	-1.0	-1.1	-0.7	-1.7	-2.2	-2.7	-2.7	-3.7	-1.3	-1.4	-1.5	-1.0	-1.1	-1.1	-0.5	0.8	1.7	-0.2	0.6	-1.8	-2.1	-3.0	-1.0	0.2	-0.6	-1.9	-2.2	-0.8	-0.5	-0.9
-1.1	-1.4	0.2	1.4	1.5	1.1	0.3	-2.5	3.9	-3.7	-4.6	-5.2	-4.5	-1.6	-0.3	-1.2	-1.4	-1.2	-1.0	0.0	1.6	2.2	1.0	0.4	0.2	0.2	-2.8	-2.9	-0.1	-1.0	-0.8	-0.6	-0.1	-0.2	-1.0	-0.8
-1.9	-1.0	-0.4	0.0	-0.8	-0.5	-0.8	-5.9	-10.0	-6.6	-4.4	-3.5	-2.7	-1.9	-2.7	-2.1	-5.8	-4.5	-3.7	-3.1	-1.0	-1.8	-0.3	1.4	1.3	-0.7	-4.7	-8.2	-6.8	-4.1	-4.7	-5.2	-5.9	-4.4	-4.4	-3.2
-6.6	-6.0	-5.0	-4.0	-2.4	-0.8	-0.2	-0.7	-1.4	-4.2	-9.6	-7.8	-1.1	-1.2	-1.1	-1.2	-3.0	-0.7	-3.8	-6.8	-6.7	-1.4	1.5	1.6	-1.1	-1.5	-4.6	-12.1	-9.9	-7.9	-4.3	-1.8	-2.7	-4.8	-5.7	-6.7
-4.5	-2.6	-0.9	0.7	0.8	1.0	1.6	1.3	1.6	1.1	-6.2	-10.8	-5.8	-1.6	1.2	1.7	1.6	1.7	2.2	-1.7	-6.1	-0.1	1.2	-0.1	-3.2	-5.6	-4.7	-8.4	-3.8	-0.7	-0.8	-2.2	-2.6	-4.3	-6.7	-8.2
-1.1	0.1	0.6	1.2	1.5	1.7	1.4	1.4	1.2	1.4	-0.9	-3.9	-4.3	-3.1	0.4	1.4	1.7	1.6	1.4	0.3	-2.0	-0.4	0.9	1.1	1.3	1.2	0.4	1.2	1.0	1.2	0.9	0.4	0.4	-0.5	-1.5	-2.6
-0.8	-0.8	-1.2	-1.8	-1.1	-0.4	0.4	1.1	0.8	1.1	1.7	-0.5	-4.0	-3.8	-1.9	-1.1	0.3	0.4	1.4	0.6	-1.8	-1.4	-0.4	0.7	1.2	1.3	1.6	1.4	1.1	1.2	0.4	-0.3	-0.3	0.7	0.9	-0.8
-1.1	-1.1	-2.4	-2.5	-2.6	-4.0	-5.4	-4.3	-3.5	-2.6	-2.0	-2.3	-4.4	-4.5	-3.6	-2.4	-2.9	-3.4	-1.5	-0.5	-1.8	-3.1	-1.5	-0.2	0.3	0.1	0.8	0.6	0.8	0.6	0.0	0.0	-0.9	-1.9	-2.6	-1.4
-2.7	-2.1	-1.4	-1.9	-2.7	-4.3	-4.1	-4.0	-3.9	-3.4	-5.0	-4.3	-3.7	-4.8	-3.6	-2.6	-2.4	-2.8	-2.3	-2.4	-2.4	-3.0	-3.4	-2.8	-2.4	-1.8	-2.0	-2.4	-2.3	-2.2	-2.6	-3.0	-3.1	-3.1	-3.8	-4.5
-4.4	-3.5	-3.6	-3.3	-3.7	-4.1	-5.2	-5.0	-4.1	-3.4	-3.7	-3.7	-2.7	-2.8	-3.4	-2.8	-3.8	-5.0	-4.2	-4.0	-4.4	-4.7	-4.8	-5.4	-5.0	-4.6	-4.6	-4.2	-4.3	-4.8	-4.3	-4.2	-4.4	-4.4	-3.9	-4.9
-4.7	-4.6	-4.0	-3.9	-4.2	-5.0	-5.2	-5.0	-4.4	-3.7	-3.9	-5.3	-5.1	-3.8	-3.4	-3.2	-3.1	-3.6	-4.0	-4.1	-4.2	-5.1	-5.8	-5.6	-5.1	-5.2	-4.5	-4.6	-4.5	-3.8	-3.7	-3.3	-4.2	-5.4	-5.8	-5.5
-4.5	-4.6	-5.4	-7.0	-7.9	-8.0	-8.4	-8.0	-7.3	-5.9	-6.1	-6.9	-5.2	-3.6	-3.1	-2.8	-4.5	-4.6	-4.6	-4.2	-3.9	-2.8	-2.3	-2.4	-2.9	-3.0	-2.5	-2.2	-2.8	-1.5	-1.2	-0.8	-2.1	-2.8	-4.2	-4.9
-5.0	-5.7	-6.5	-8.0	-8.3	-7.7	-7.9	-7.1	-5.7	-5.4	-4.9	-4.9	-4.2	-2.8	-2.5	-2.7	-3.2	-3.6	-3.5	-3.0	-2.5	-2.3	-2.8	-2.1	-2.0	-2.1	-2.4	-2.6	-2.8	-2.5	-2.3	-2.0	-2.7	-2.8	-5.1	-4.9

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-1.6	-1.7	-1.6	-1.6	-1.4	-1.3	-1.3	-1.3	-1.4	-1.3	-1.2	-1.5	-1.3	-1.2	-0.9	-0.8	-1.0	-0.9	-0.9	-1.2	-1.3	-1.2	-1.3	-1.6	-1.6	-1.8	-2.1	-1.8	-1.3	-1.3	-1.2	-1.4	-1.6	-1.7	-1.4	-1.4
-2.0	-2.2	-2.0	-1.8	-1.2	-1.2	-1.4	-1.3	-1.5	-2.0	-2.4	-2.1	-1.7	-2.2	-2.1	-1.4	-1.8	-2.0	-2.4	-2.4	-2.5	-2.5	-2.2	-2.5	-2.5	-2.4	-2.4	-2.7	-2.5	-1.9	-2.1	-2.4	-2.2	-2.0	-1.8	-1.8
-2.8	-3.2	-3.4	-3.2	-2.6	-2.5	-1.9	-2.0	-2.1	-2.6	-2.9	-2.9	-2.9	-3.7	-3.7	-3.8	-3.8	-3.3	-3.3	-3.3	-2.7	-2.4	-2.8	-3.2	-3.3	-3.2	-3.3	-3.8	-3.5	-3.3	-2.9	-3.0	-2.7	-3.0	-2.9	-2.7
-2.9	-3.8	-3.9	-4.1	-4.2	-4.4	-3.7	-3.8	-3.6	-3.7	-3.9	-3.8	-3.5	-4.3	-4.8	-3.1	-2.7	-3.0	-2.7	-1.9	-2.3	-4.1	-4.7	-4.4	-4.1	-3.7	-3.9	-3.8	-3.4	-3.9	-3.1	-3.3	-2.8	-3.8	-3.5	-2.6
-5.1	-4.8	-4.5	-3.0	-2.2	-1.5	-4.1	-4.9	-4.1	-3.3	-3.4	-4.5	-4.0	-4.2	-4.0	-3.7	-3.5	-2.9	-3.1	-3.3	-4.1	-3.7	-3.5	-0.8	0.0	-1.7	-2.0	-1.0	-1.4	-2.3	-2.3	-2.8	-3.6	-3.9	-4.6	-5.3
-4.4	-3.8	-4.1	-1.2	-0.6	-0.9	-3.0	-3.4	-2.4	-3.5	-3.8	-4.2	-4.2	-5.4	-3.0	-2.8	-3.0	-2.3	-2.2	-2.2	-1.8	-1.0	-0.5	0.3	0.3	-3.1	-3.0	-4.6	-3.6	-2.6	-2.4	-4.0	-4.4	-2.5	-2.2	-3.2
-2.8	-3.2	-2.0	-0.9	-0.7	-0.9	-1.0	-3.7	-5.2	-4.5	-6.2	-6.7	-6.0	-3.4	-1.9	-3.4	-3.4	-2.8	-1.3	0.2	0.4	-0.7	-0.6	-0.1	0.0	-1.4	-4.7	-5.6	-3.6	-4.2	-2.6	-2.0	-1.6	-2.0	-2.3	-2.5
-3.5	-2.9	-2.2	-1.7	-2.7	-2.5	-2.9	-7.1	-10.5	-7.7	-5.3	-4.4	-4.4	-3.7	-4.5	-3.9	-6.0	-4.9	-4.1	-4.1	-2.5	-3.6	-1.6	-0.2	-0.8	-2.8	-5.6	-9.1	-8.0	-5.4	-5.8	-6.0	-6.6	-5.1	-5.5	-4.5
-7.6	-7.5	-6.5	-5.6	-4.4	-3.2	-2.9	-3.3	-3.9	-6.5	-9.9	-7.3	-3.0	-3.4	-3.9	-4.0	-5.0	-3.2	-6.3	-9.0	-8.7	-4.0	-1.2	-0.9	-3.5	-3.6	-6.5	-12.9	-10.4	-8.2	-5.6	-3.4	-4.6	-6.3	-7.0	-8.2
-5.8	-4.0	-1.9	-0.7	-0.7	-0.6	-0.6	-1.0	-0.8	-1.0	-6.6	-9.1	-5.9	-2.4	-0.3	-0.3	-0.5	-0.3	-0.8	-5.0	-8.3	-2.0	-1.2	-3.1	-5.9	-7.1	-6.1	-9.3	-4.7	-2.4	-1.1	-3.8	-4.7	-6.1	-8.7	-9.2
-3.2	-2.0	-1.8	-1.1	-1.0	-0.6	-0.6	-0.7	-0.9	-0.8	-2.0	-4.0	-5.4	-4.1	-1.4	-0.6	-0.6	-0.5	-0.4	-0.7	-3.2	-1.5	-0.9	-0.7	-0.9	-1.2	-1.7	-1.2	-1.0	-0.3	0.2	-0.4	-0.9	-1.9	-3.1	-4.4
-2.9	-3.2	-3.4	-4.2	-3.9	-3.2	-1.9	-1.2	-1.3	-1.0	-0.4	-0.6	-4.9	-5.3	-4.2	-3.5	-1.8	-1.5	-0.8	0.5	-1.4	-2.5	-1.9	-1.0	-0.8	-0.8	-0.5	-0.6	-0.8	1.1	0.4	-1.3	-0.9	-0.6	-0.9	-2.6
-2.4	-2.7	-3.9	-4.1	-4.2	-5.7	-7.3	-6.1	-5.1	-4.1	-3.4	-2.9	-4.9	-6.0	-5.2	-3.9	-4.5	-5.0	-3.5	-2.4	-3.0	-4.8	-3.6	-2.4	-1.6	-1.5	-0.9	-0.9	-0.9	-0.7	-0.8	-1.0	-1.4	-3.0	-4.2	-2.8
-3.3	-2.9	-2.2	-2.7	-3.5	-4.8	-4.7	-4.5	-4.5	-4.1	-5.4	-4.3	-3.8	-4.8	-4.0	-3.3	-2.9	-3.3	-3.3	-3.7	-3.6	-4.0	-4.2	-4.0	-3.4	-2.4	-2.6	-2.8	-2.8	-2.7	-2.9	-3.2	-3.3	-3.3	-4.2	-4.4
-3.9	-3.3	-3.3	-3.2	-3.6	-4.1	-5.0	-4.9	-4.1	-3.9	-4.1	-3.8	-2.8	-2.6	-3.2	-2.7	-3.4	-4.3	-3.5	-3.2	-3.4	-3.7	-3.7	-4.1	-3.7	-3.2	-3.2	-2.9	-2.9	-3.2	-3.0	-3.0	-3.1	-3.4	-3.4	-4.3
-3.0	-3.1	-2.7	-2.9	-3.4	-4.2	-4.6	-4.7	-4.2	-3.8	-3.8	-4.4	-4.2	-3.3	-2.9	-2.6	-2.3	-2.4	-2.4	-2.4	-2.8	-3.3	-3.8	-3.5	-3.2	-3.2	-2.5	-2.4	-2.3	-1.8	-1.9	-1.7	-2.3	-3.0	-3.4	-3.6
-2.8	-3.0	-3.6	-4.5	-5.2	-5.6	-6.1	-6.1	-5.7	-4.5	-4.5	-4.2	-3.0	-2.0	-1.6	-1.5	-2.1	-2.1	-2.0	-2.0	-2.0	-1.5	-1.3	-1.1	-1.4	-1.4	-1.0	-0.8	-0.6	-0.3	-0.2	0.0	-0.3	-0.8	-2.3	-2.7
-2.5	-3.0	-3.7	-4.5	-4.7	-4.4	-4.5	-3.8	-3.0	-2.6	-2.2	-1.9	-1.4	-0.7	-0.5	-0.6	-0.7	-0.7	-0.7	-0.6	-0.6	-0.4	-0.4	-0.3	-0.4	-0.3	-0.3	-0.3	-0.5	-0.4	-0.4	-0.3	-0.8	-1.2	-2.4	-2.4

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

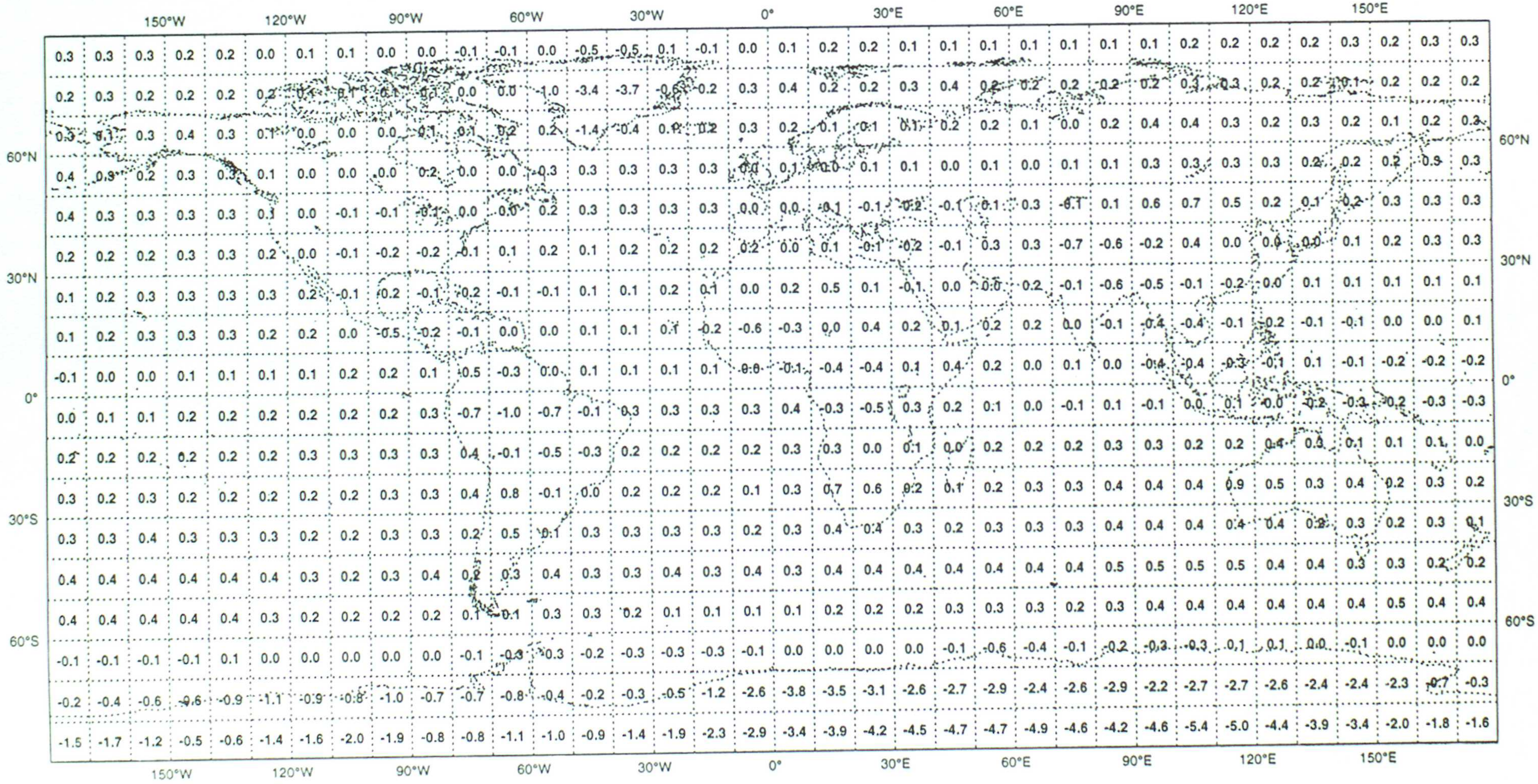

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.3 0.3 0.3 0.2 0.2 0.0 0.1 0.1 0.0 0.0 -0.1 -0.1 0.0 -0.5 -0.5 0.1 -0.1 0.0 0.1 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.3 0.2 0.3 0.3
0.2 0.3 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.0 0.0 -1.0 -3.4 -3.7 -0.6 -0.2 0.3 0.4 0.2 0.2 0.3 0.4 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.2 0.2 0.1 0.2 0.2 0.2
0.3 0.1 0.3 0.4 0.3 0.1 0.0 0.0 0.0 0.1 0.1 0.2 0.2 -1.4 -0.4 0.1 0.2 0.3 0.2 0.1 0.1 0.1 0.2 0.2 0.1 0.0 0.2 0.4 0.4 0.3 0.2 0.3 0.2 0.1 0.2 0.3
0.4 0.3 0.2 0.3 0.3 0.1 0.0 0.0 0.0 0.2 0.0 0.0 -0.3 0.3 0.3 0.3 0.3 0.0 0.1 0.0 0.1 0.1 0.0 0.1 0.0 0.1 0.1 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.3
0.4 0.3 0.3 0.3 0.3 0.1 0.0 -0.1 -0.1 -0.1 0.0 0.0 0.2 0.3 0.3 0.3 0.3 0.0 0.0 -0.1 -0.1 -0.2 -0.1 0.1 0.3 -0.1 0.1 0.6 0.7 0.5 0.2 0.1 -0.2 0.3 0.3 0.3
0.2 0.2 0.2 0.3 0.3 0.2 0.0 -0.1 -0.2 -0.2 -0.1 0.1 0.2 0.1 0.2 0.2 0.2 0.2 0.0 0.1 -0.1 -0.2 -0.1 0.3 0.3 -0.7 -0.6 -0.2 0.4 0.0 0.0 0.0 0.1 0.2 0.3 0.3
0.1 0.2 0.3 0.3 0.3 0.3 0.2 -0.1 0.2 -0.1 0.2 -0.1 -0.1 0.1 0.1 0.2 0.1 0.0 0.2 0.5 0.1 -0.1 0.0 0.0 0.2 -0.1 -0.6 -0.5 -0.1 -0.2 0.0 0.1 0.1 0.1 0.1 0.1
0.1 0.2 0.3 0.3 0.3 0.2 0.2 0.0 -0.5 -0.2 -0.1 0.0 0.0 0.1 0.1 0.1 -0.2 -0.6 -0.3 0.0 0.4 0.2 0.1 0.2 0.2 0.0 -0.1 -0.4 -0.4 -0.1 -0.2 -0.1 -0.1 0.0 0.0 0.1
-0.1 0.0 0.0 0.1 0.1 0.1 0.1 0.2 0.2 0.1 -0.5 -0.3 0.0 0.1 0.1 0.1 0.1 0.0 -0.1 -0.4 -0.4 0.1 0.4 0.2 0.0 0.1 0.0 -0.4 -0.4 -0.3 -0.1 0.1 -0.1 -0.2 -0.2 -0.2
0.0 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.3 -0.7 -1.0 -0.7 -0.1 0.3 0.3 0.3 0.3 0.4 -0.3 -0.5 0.3 0.2 0.1 0.0 -0.1 0.1 -0.1 0.0 0.1 0.0 -0.2 -0.3 -0.2 -0.3 -0.3
0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.4 -0.1 -0.5 -0.3 0.2 0.2 0.2 0.2 0.3 0.3 0.0 0.1 0.0 0.2 0.2 0.2 0.3 0.3 0.2 0.2 0.4 0.3 0.1 0.1 0.1 0.0
0.3 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.4 0.8 -0.1 0.0 0.2 0.2 0.2 0.1 0.3 0.7 0.6 0.2 0.1 0.2 0.3 0.3 0.4 0.4 0.4 0.9 0.5 0.3 0.4 0.2 0.3 0.2
0.3 0.3 0.4 0.3 0.3 0.3 0.2 0.2 0.3 0.3 0.2 0.5 0.1 0.3 0.3 0.3 0.3 0.2 0.3 0.4 0.4 0.3 0.2 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.2 0.3 0.2 0.3 0.1
0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.2 0.3 0.4 0.2 0.3 0.4 0.3 0.3 0.4 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.3 0.3 0.2 0.2
0.4 0.4 0.4 0.4 0.4 0.3 0.2 0.2 0.2 0.2 0.1 0.1 0.3 0.3 0.2 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.3 0.3 0.3 0.2 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.4 0.4
-0.1 -0.1 -0.1 -0.1 0.1 0.0 0.0 0.0 0.0 0.0 -0.1 -0.3 -0.3 -0.2 -0.3 -0.3 -0.3 -0.1 0.0 0.0 0.0 0.0 -0.1 -0.6 -0.4 -0.1 -0.2 -0.3 -0.3 0.1 0.1 0.0 -0.1 0.0 0.0 0.0
-0.2 -0.4 -0.6 -0.6 -0.9 -1.1 -0.9 -0.8 -1.0 -0.7 -0.7 -0.8 -0.4 -0.2 -0.3 -0.5 -1.2 -2.6 -3.8 -3.5 -3.1 -2.6 -2.7 -2.9 -2.4 -2.6 -2.9 -2.2 -2.7 -2.7 -2.6 -2.4 -2.4 -2.3 -0.7 -0.3
-1.5 -1.7 -1.2 -0.5 -0.6 -1.4 -1.6 -2.0 -1.9 -0.8 -0.8 -1.1 -1.0 -0.9 -1.4 -1.9 -2.3 -2.9 -3.4 -3.9 -4.2 -4.5 -4.7 -4.7 -4.9 -4.6 -4.2 -4.6 -5.4 -5.0 -4.4 -3.9 -3.4 -2.0 -1.8 -1.6

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

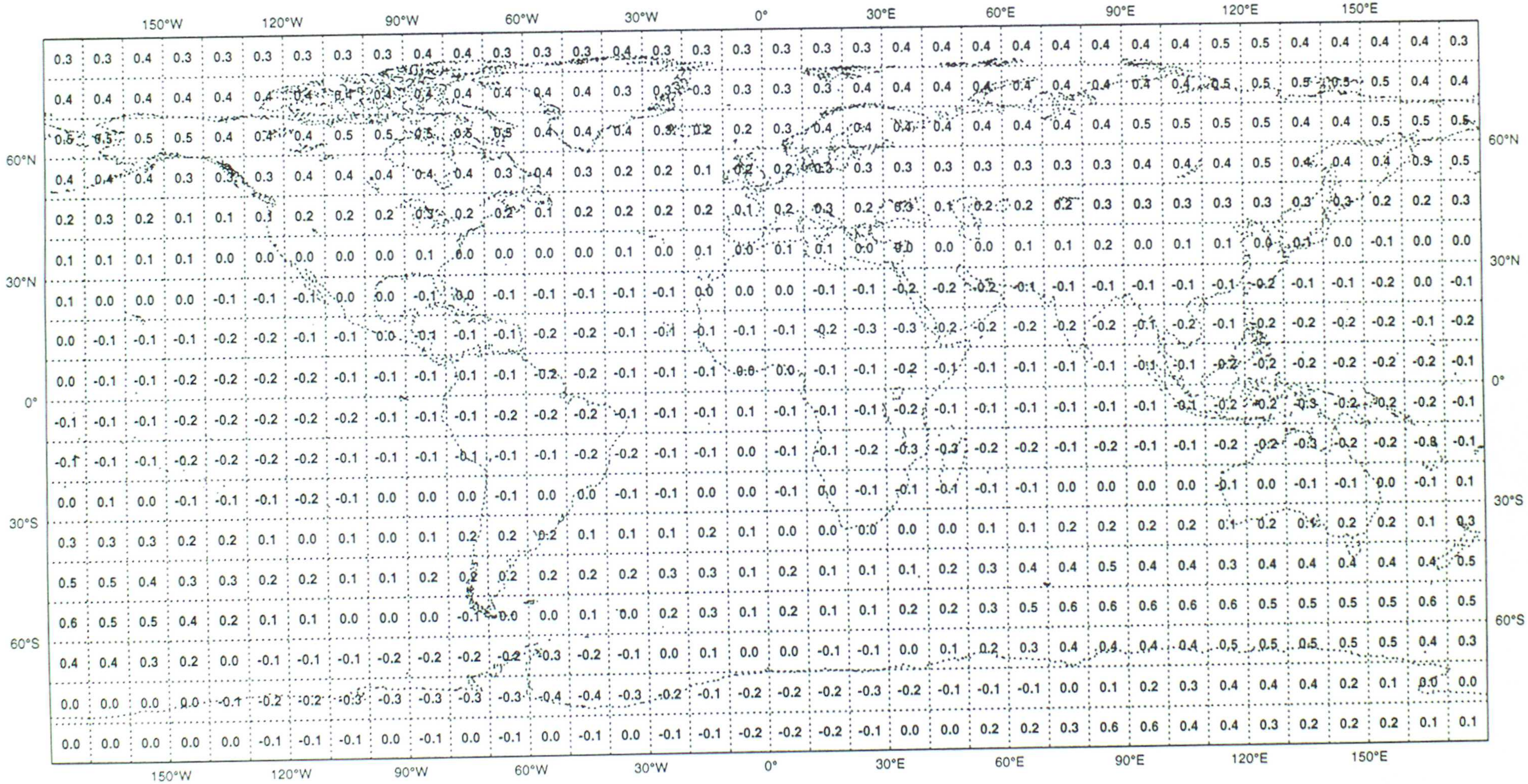

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.3
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.4
0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.3 0.2 0.2 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5
0.4 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.2 0.2 0.1 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.3 0.5
0.2 0.3 0.2 0.1 0.1 0.1 0.2 0.2 0.2 0.3 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.1 0.2 0.3 0.2 0.3 0.1 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.3
0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.1 0.0 0.1 0.0 0.1 0.1 0.0 0.0 0.0 0.0 0.1 0.1 0.2 0.0 0.1 0.1 0.0 0.1 0.0 -0.1 0.0 0.0
0.1 0.0 0.0 0.0 -0.1 -0.1 -0.1 0.0 0.0 -0.1 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0 0.0 -0.1 -0.1 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.2 -0.1 -0.1 -0.2 0.0 -0.1
0.0 -0.1 -0.1 -0.1 -0.2 -0.2 -0.1 -0.1 0.0 -0.1 -0.1 -0.1 -0.2 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 -0.2 -0.3 -0.3 -0.2 -0.2 -0.2 -0.2 -0.2 -0.1 -0.2 -0.1 -0.2 -0.2 -0.2 -0.2 -0.1 -0.2
0.0 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0 -0.1 -0.1 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.1
-0.1 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.1 -0.1 -0.1 -0.1 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.2 -0.2 -0.3 -0.2 -0.2 -0.2 -0.1
-0.1 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.2 -0.2 -0.1 -0.1 0.0 -0.1 -0.1 -0.2 -0.3 -0.3 -0.2 -0.2 -0.1 -0.2 -0.1 -0.1 -0.2 -0.2 -0.3 -0.2 -0.2 -0.8 -0.1
0.0 0.1 0.0 -0.1 -0.1 -0.1 -0.2 -0.1 0.0 0.0 0.0 -0.1 0.0 0.0 -0.1 -0.1 0.0 0.0 -0.1 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.0 -0.1 0.0 -0.1 -0.1 0.0 -0.1 0.1
0.3 0.3 0.3 0.2 0.2 0.1 0.0 0.1 0.0 0.1 0.2 0.2 0.2 0.1 0.1 0.1 0.2 0.1 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.2 0.2 0.2 0.2 0.1 0.2 0.1 0.2 0.2 0.1 0.3
0.5 0.5 0.4 0.3 0.3 0.2 0.2 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.1 0.2 0.1 0.1 0.1 0.2 0.3 0.4 0.4 0.5 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.5
0.6 0.5 0.5 0.4 0.2 0.1 0.1 0.0 0.0 0.0 -0.1 0.0 0.0 0.1 0.0 0.2 0.3 0.1 0.2 0.1 0.1 0.2 0.2 0.3 0.5 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5 0.5 0.6 0.5
0.4 0.4 0.3 0.2 0.0 -0.1 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.3 -0.2 -0.1 0.0 0.1 0.0 0.0 -0.1 -0.1 0.0 0.1 0.2 0.3 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.3
0.0 0.0 0.0 0.0 -0.1 -0.2 -0.2 -0.3 -0.3 -0.3 -0.3 -0.3 -0.4 -0.4 -0.3 -0.2 -0.1 -0.2 -0.2 -0.2 -0.3 -0.2 -0.1 -0.1 -0.1 0.0 0.1 0.2 0.3 0.4 0.4 0.4 0.2 0.1 0.0 0.0
0.0 0.0 0.0 0.0 0.0 -0.1 -0.1 -0.1 0.0 -0.1 0.0 -0.1 0.0 -0.1 0.0 -0.1 -0.1 -0.2 -0.2 -0.2 -0.1 0.0 0.0 0.2 0.2 0.3 0.6 0.6 0.4 0.4 0.3 0.2 0.2 0.2 0.1 0.1

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

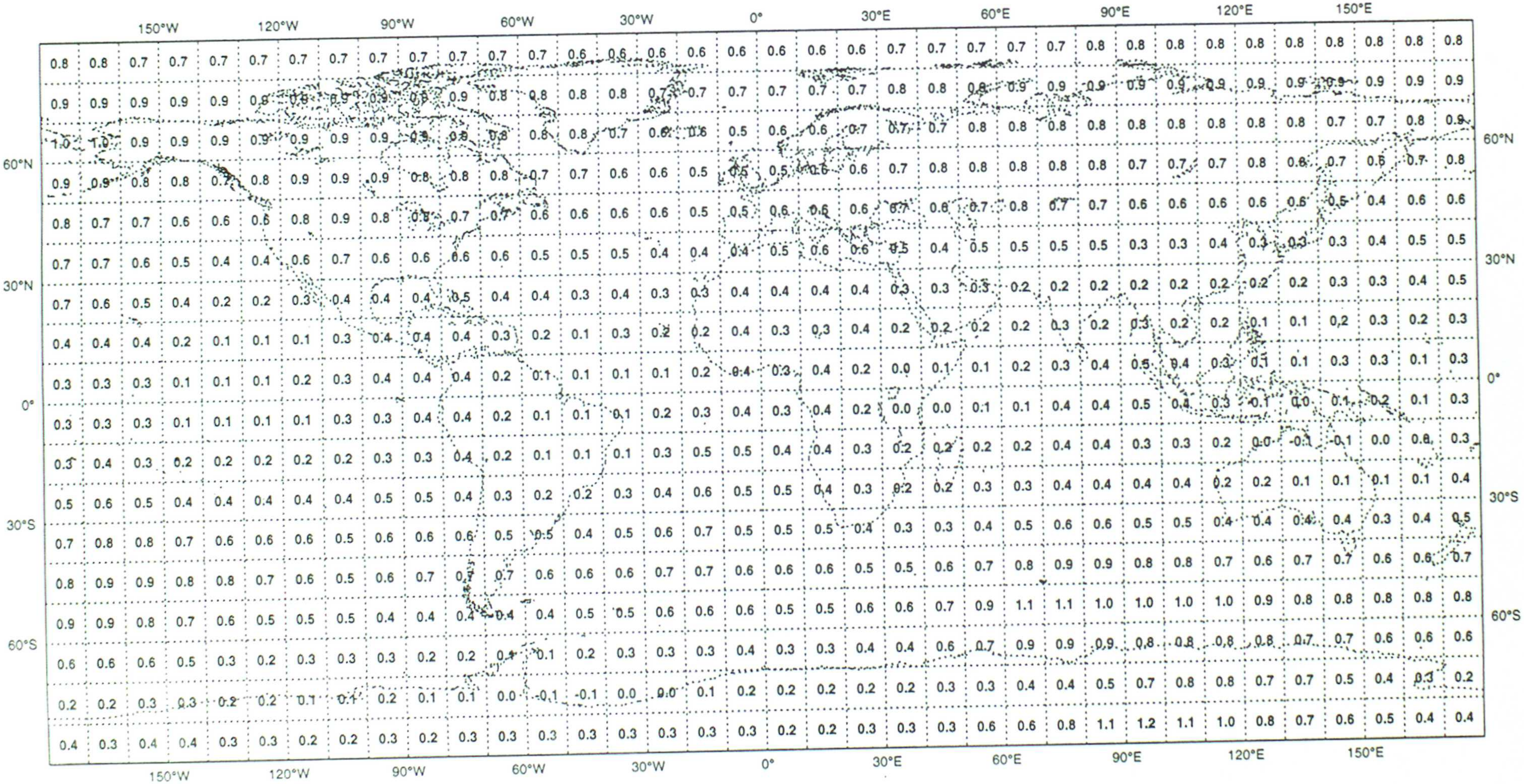
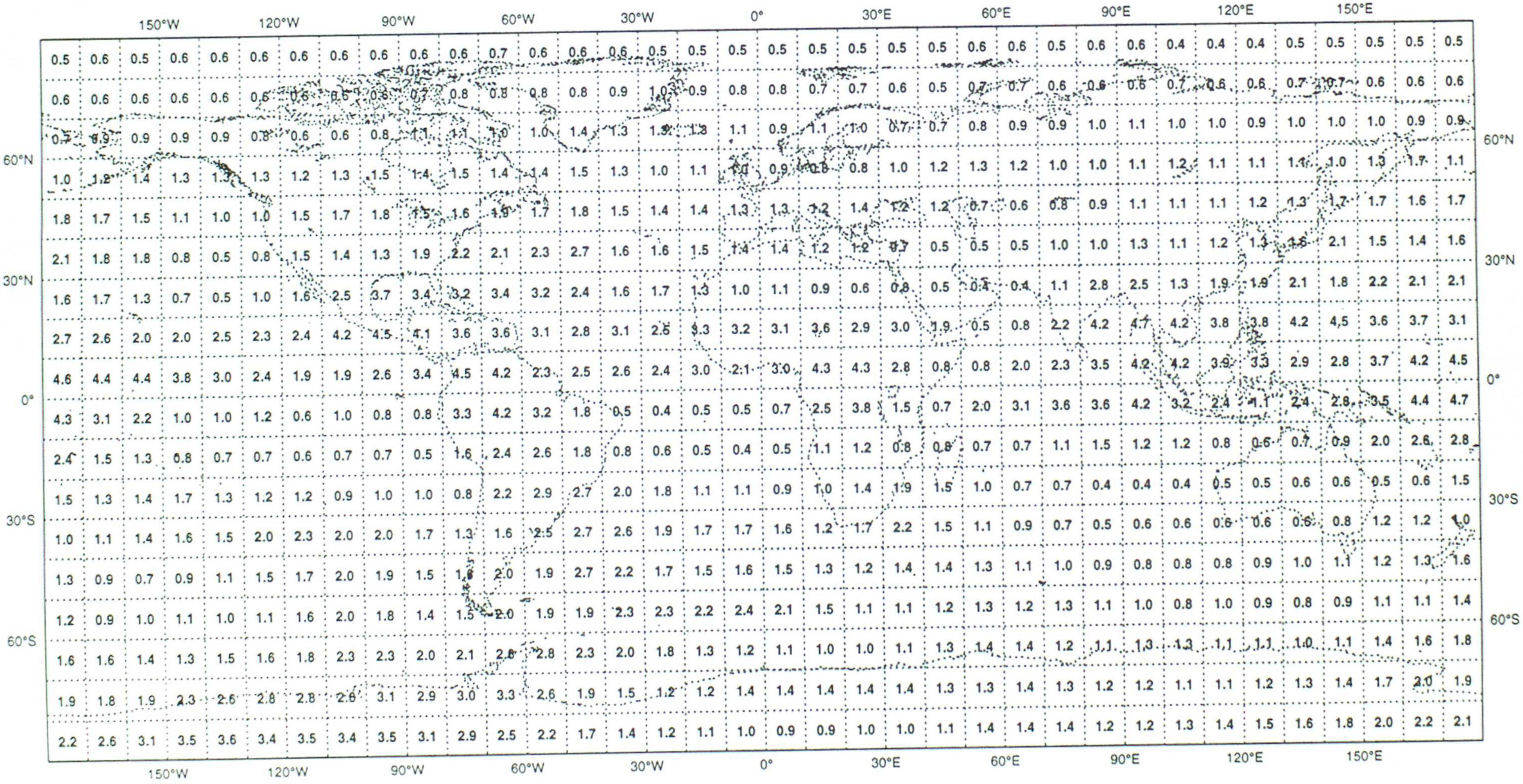
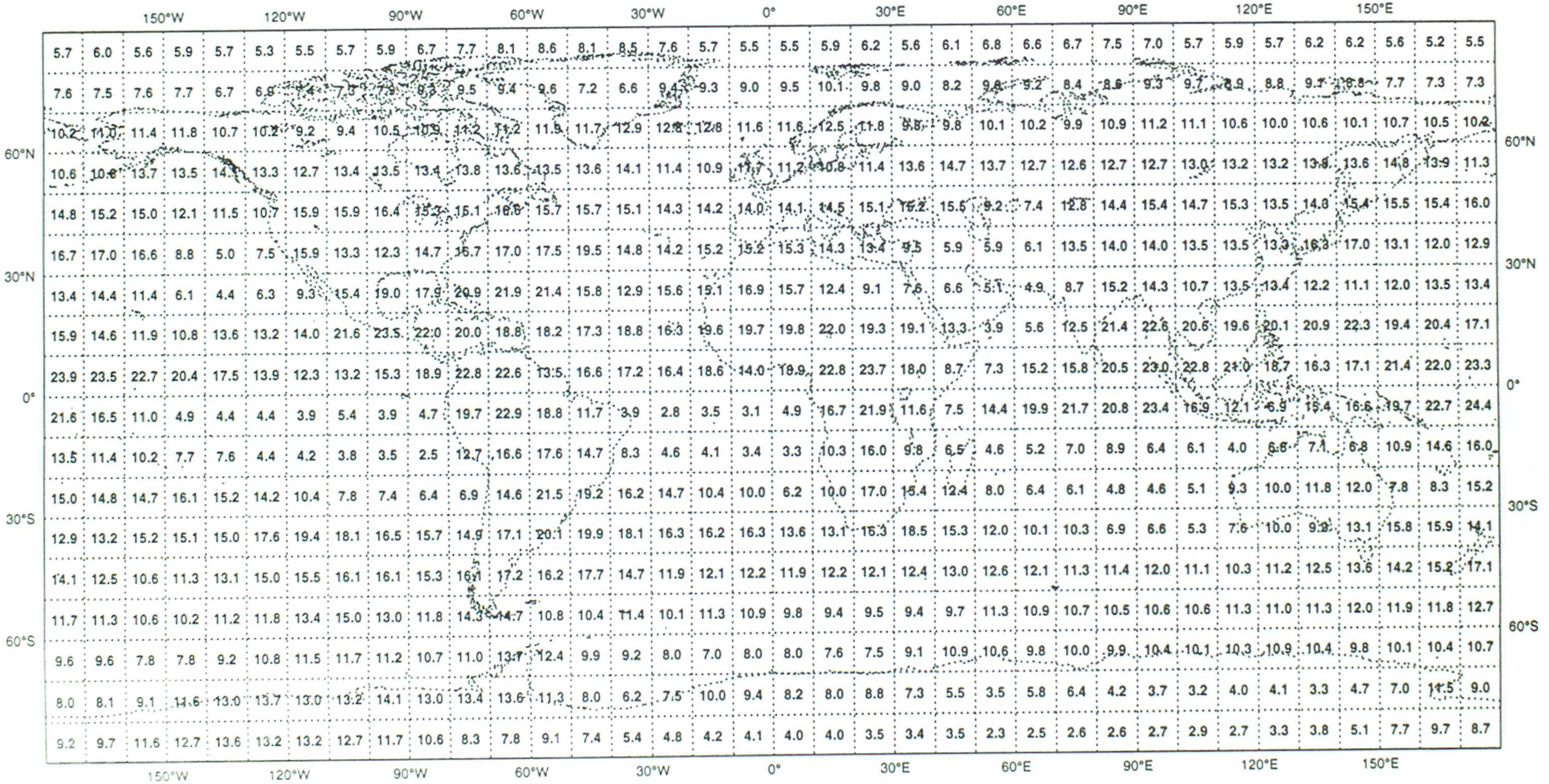

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.6	0.6	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.8	0.9	1.0	0.9	0.8	0.8	0.7	0.7	0.6	0.5	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.6
0.7	0.9	0.9	0.9	0.9	0.8	0.6	0.6	0.8	1.1	1.1	1.0	1.0	1.4	1.3	1.3	1.3	1.1	0.9	1.1	1.0	0.7	0.7	0.8	0.9	0.9	1.0	1.1	1.0	1.0	0.9	1.0	1.0	1.0	0.9	0.9
1.0	1.2	1.4	1.3	1.3	1.3	1.2	1.3	1.5	1.4	1.5	1.4	1.4	1.5	1.3	1.0	1.1	1.0	0.9	0.8	0.8	1.0	1.2	1.3	1.2	1.0	1.0	1.1	1.2	1.1	1.1	1.1	1.0	1.3	1.7	1.1
1.8	1.7	1.5	1.1	1.0	1.0	1.5	1.7	1.8	1.5	1.6	1.9	1.7	1.8	1.5	1.4	1.4	1.3	1.3	1.2	1.4	1.2	1.2	0.7	0.6	0.8	0.9	1.1	1.1	1.1	1.2	1.3	1.7	1.7	1.6	1.7
2.1	1.8	1.8	0.8	0.5	0.8	1.5	1.4	1.3	1.9	2.2	2.1	2.3	2.7	1.6	1.6	1.5	1.4	1.4	1.2	1.2	0.7	0.5	0.5	0.5	1.0	1.0	1.3	1.1	1.2	1.3	1.6	2.1	1.5	1.4	1.6
1.6	1.7	1.3	0.7	0.5	1.0	1.6	2.5	3.7	3.4	3.2	3.4	3.2	2.4	1.6	1.7	1.3	1.0	1.1	0.9	0.6	0.8	0.5	0.4	0.4	1.1	2.8	2.5	1.3	1.9	1.9	2.1	1.8	2.2	2.1	2.1
2.7	2.6	2.0	2.0	2.5	2.3	2.4	4.2	4.5	4.1	3.6	3.6	3.1	2.8	3.1	2.5	3.3	3.2	3.1	3.6	2.9	3.0	1.9	0.5	0.8	2.2	4.2	4.7	4.2	3.8	3.8	4.2	4.5	3.6	3.7	3.1
4.6	4.4	4.4	3.8	3.0	2.4	1.9	1.9	2.6	3.4	4.5	4.2	2.3	2.5	2.6	2.4	3.0	2.1	3.0	4.3	4.3	2.8	0.8	0.8	2.0	2.3	3.5	4.2	4.2	3.9	3.3	2.9	2.8	3.7	4.2	4.5
4.3	3.1	2.2	1.0	1.0	1.2	0.6	1.0	0.8	0.8	3.3	4.2	3.2	1.8	0.5	0.4	0.5	0.5	0.7	2.5	3.8	1.5	0.7	2.0	3.1	3.6	3.6	4.2	3.2	2.4	1.1	2.4	2.8	3.5	4.4	4.7
2.4	1.5	1.3	0.8	0.7	0.7	0.6	0.7	0.7	0.5	1.6	2.4	2.6	1.8	0.8	0.6	0.5	0.4	0.5	1.1	1.2	0.8	0.8	0.7	0.7	1.1	1.5	1.2	1.2	0.8	0.6	0.7	0.9	2.0	2.6	2.8
1.5	1.3	1.4	1.7	1.3	1.2	1.2	0.9	1.0	1.0	0.8	2.2	2.9	2.7	2.0	1.8	1.1	1.1	0.9	1.0	1.4	1.9	1.5	1.0	0.7	0.7	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.5	0.6	1.5
1.0	1.1	1.4	1.6	1.5	2.0	2.3	2.0	2.0	1.7	1.3	1.6	2.5	2.7	2.6	1.9	1.7	1.7	1.6	1.2	1.7	2.2	1.5	1.1	0.9	0.7	0.5	0.6	0.6	0.6	0.6	0.6	0.8	1.2	1.2	1.0
1.3	0.9	0.7	0.9	1.1	1.5	1.7	2.0	1.9	1.5	1.8	2.0	1.9	2.7	2.2	1.7	1.5	1.6	1.5	1.3	1.2	1.4	1.4	1.3	1.1	1.0	0.9	0.8	0.8	0.8	0.9	1.0	1.1	1.2	1.3	1.6
1.2	0.9	1.0	1.1	1.0	1.1	1.6	2.0	1.8	1.4	1.5	2.0	1.9	1.9	2.3	2.3	2.2	2.4	2.1	1.5	1.1	1.1	1.2	1.3	1.2	1.3	1.1	1.0	0.8	1.0	0.9	0.8	0.9	1.1	1.1	1.4
1.6	1.6	1.4	1.3	1.5	1.6	1.8	2.3	2.3	2.0	2.1	2.8	2.8	2.3	2.0	1.8	1.3	1.2	1.1	1.0	1.0	1.1	1.3	1.4	1.4	1.2	1.1	1.3	1.3	1.1	1.1	1.0	1.1	1.4	1.6	1.8
1.9	1.8	1.9	2.3	2.6	2.8	2.8	2.8	3.1	2.9	3.0	3.3	2.6	1.9	1.5	1.2	1.2	1.4	1.4	1.4	1.4	1.4	1.3	1.3	1.4	1.3	1.2	1.2	1.1	1.1	1.2	1.3	1.4	1.7	2.0	1.9
2.2	2.6	3.1	3.5	3.6	3.4	3.5	3.4	3.5	3.1	2.9	2.5	2.2	1.7	1.4	1.2	1.1	1.0	0.9	0.9	1.0	1.0	1.1	1.4	1.4	1.4	1.2	1.2	1.3	1.4	1.5	1.6	1.8	2.0	2.2	2.1

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



5.7	6.0	5.6	5.9	5.7	5.3	5.5	5.7	5.9	6.7	7.7	8.1	8.6	8.1	8.5	7.6	5.7	5.5	5.5	5.9	6.2	5.6	6.1	6.8	6.6	6.7	7.5	7.0	5.7	5.9	5.7	6.2	6.2	5.6	5.2	5.5
7.6	7.5	7.6	7.7	6.7	6.8	7.4	7.3	7.9	9.3	9.5	9.4	9.6	7.2	6.6	9.4	9.3	9.0	9.5	10.1	9.8	9.0	8.2	9.8	9.2	8.4	8.6	9.3	9.7	8.9	8.8	9.1	8.8	7.7	7.3	7.3
10.2	11.0	11.4	11.8	10.7	10.2	9.2	9.4	10.5	10.9	11.2	11.2	11.5	11.7	12.9	12.8	12.8	11.6	11.6	12.5	11.8	9.8	9.8	10.1	10.2	9.9	10.9	11.2	11.1	10.6	10.0	10.6	10.1	10.7	10.5	10.2
10.6	10.8	13.7	13.5	14.[illegible]	13.3	12.7	13.4	13.5	13.4	13.8	13.6	13.5	13.6	14.1	11.4	10.9	11.7	11.2	10.8	11.4	13.6	14.7	13.7	12.7	12.6	12.7	12.7	13.0	13.2	13.2	13.8	13.6	14.8	13.9	11.3
14.8	15.2	15.0	12.1	11.5	10.7	15.9	15.9	16.4	15.3	15.1	16.6	15.7	15.7	15.1	14.3	14.2	14.0	14.1	14.5	15.1	15.2	15.5	9.2	7.4	12.8	14.4	15.4	14.7	15.3	13.5	14.8	15.4	15.5	15.4	16.0
16.7	17.0	16.6	8.8	5.0	7.5	15.9	13.3	12.3	14.7	16.7	17.0	17.5	19.5	14.8	14.2	15.2	15.2	15.3	14.3	13.4	9.5	5.9	5.9	6.1	13.5	14.0	14.0	13.5	13.5	13.3	16.3	17.0	13.1	12.0	12.9
13.4	14.4	11.4	6.1	4.4	6.3	9.3	15.4	19.0	17.9	20.9	21.9	21.4	15.8	12.9	15.6	15.1	16.9	15.7	12.4	9.1	7.6	6.6	5.1	4.9	8.7	15.2	14.3	10.7	13.5	13.4	12.2	11.1	12.0	13.5	13.4
15.9	14.6	11.9	10.8	13.6	13.2	14.0	21.6	23.5	22.0	20.0	18.8	18.2	17.3	18.8	16.3	19.6	19.7	19.8	22.0	19.3	19.1	13.3	3.9	5.6	12.5	21.4	22.6	20.6	19.6	20.1	20.9	22.3	19.4	20.4	17.1
23.9	23.5	22.7	20.4	17.5	13.9	12.3	13.2	15.3	18.9	22.8	22.6	13.5	16.6	17.2	16.4	18.6	14.0	18.9	22.8	23.7	18.0	8.7	7.3	15.2	15.8	20.5	23.0	22.8	21.0	18.7	16.3	17.1	21.4	22.0	23.3
21.6	16.5	11.0	4.9	4.4	4.4	3.9	5.4	3.9	4.7	19.7	22.9	18.8	11.7	3.9	2.8	3.5	3.1	4.9	16.7	21.9	11.6	7.5	14.4	19.9	21.7	20.8	23.4	16.9	12.1	6.9	15.4	16.6	19.7	22.7	24.4
13.5	11.4	10.2	7.7	7.6	4.4	4.2	3.8	3.5	2.5	12.7	16.6	17.6	14.7	8.3	4.6	4.1	3.4	3.3	10.3	16.0	9.8	6.5	4.6	5.2	7.0	8.9	6.4	6.1	4.0	6.6	7.1	6.8	10.9	14.6	16.0
15.0	14.8	14.7	16.1	15.2	14.2	10.4	7.8	7.4	6.4	6.9	14.6	21.5	19.2	16.2	14.7	10.4	10.0	6.2	10.0	17.0	15.4	12.4	8.0	6.4	6.1	4.8	4.6	5.1	9.3	10.0	11.8	12.0	7.8	8.3	15.2
12.9	13.2	15.2	15.1	15.0	17.6	19.4	18.1	16.5	15.7	14.9	17.1	20.1	19.9	18.1	16.3	16.2	16.3	13.6	13.1	16.3	18.5	15.3	12.0	10.1	10.3	6.9	6.6	5.3	7.6	10.0	9.2	13.1	15.8	15.9	14.1
14.1	12.5	10.6	11.3	13.1	15.0	15.5	16.1	16.1	15.3	16.1	17.2	16.2	17.7	14.7	11.9	12.1	12.2	11.9	12.2	12.1	12.4	13.0	12.6	12.1	11.3	11.4	12.0	11.1	10.3	11.2	12.5	13.6	14.2	15.2	17.1
11.7	11.3	10.6	10.2	11.2	11.8	13.4	15.0	13.0	11.8	14.3	14.7	10.8	10.4	11.4	10.1	11.3	10.9	9.8	9.4	9.5	9.4	9.7	11.3	10.9	10.7	10.5	10.6	10.6	11.3	11.0	11.3	12.0	11.9	11.8	12.7
9.6	9.6	7.8	7.8	9.2	10.8	11.5	11.7	11.2	10.7	11.0	13.1	12.4	9.9	9.2	8.0	7.0	8.0	8.0	7.6	7.5	9.1	10.9	10.6	9.8	10.0	9.9	10.4	10.1	10.3	10.9	10.4	9.8	10.1	10.4	10.7
8.0	8.1	9.1	11.6	13.0	13.7	13.0	13.2	14.1	13.0	13.4	13.6	11.3	8.0	6.2	7.5	10.0	9.4	8.2	8.0	8.8	7.3	5.5	3.5	5.8	6.4	4.2	3.7	3.2	4.0	4.1	3.3	4.7	7.0	11.5	9.0
9.2	9.7	11.6	12.7	13.6	13.2	13.2	12.7	11.7	10.6	8.3	7.8	9.1	7.4	5.4	4.8	4.2	4.1	4.0	4.0	3.5	3.4	3.5	2.3	2.5	2.6	2.6	2.7	2.9	2.7	3.3	3.8	5.1	7.7	9.7	8.7

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

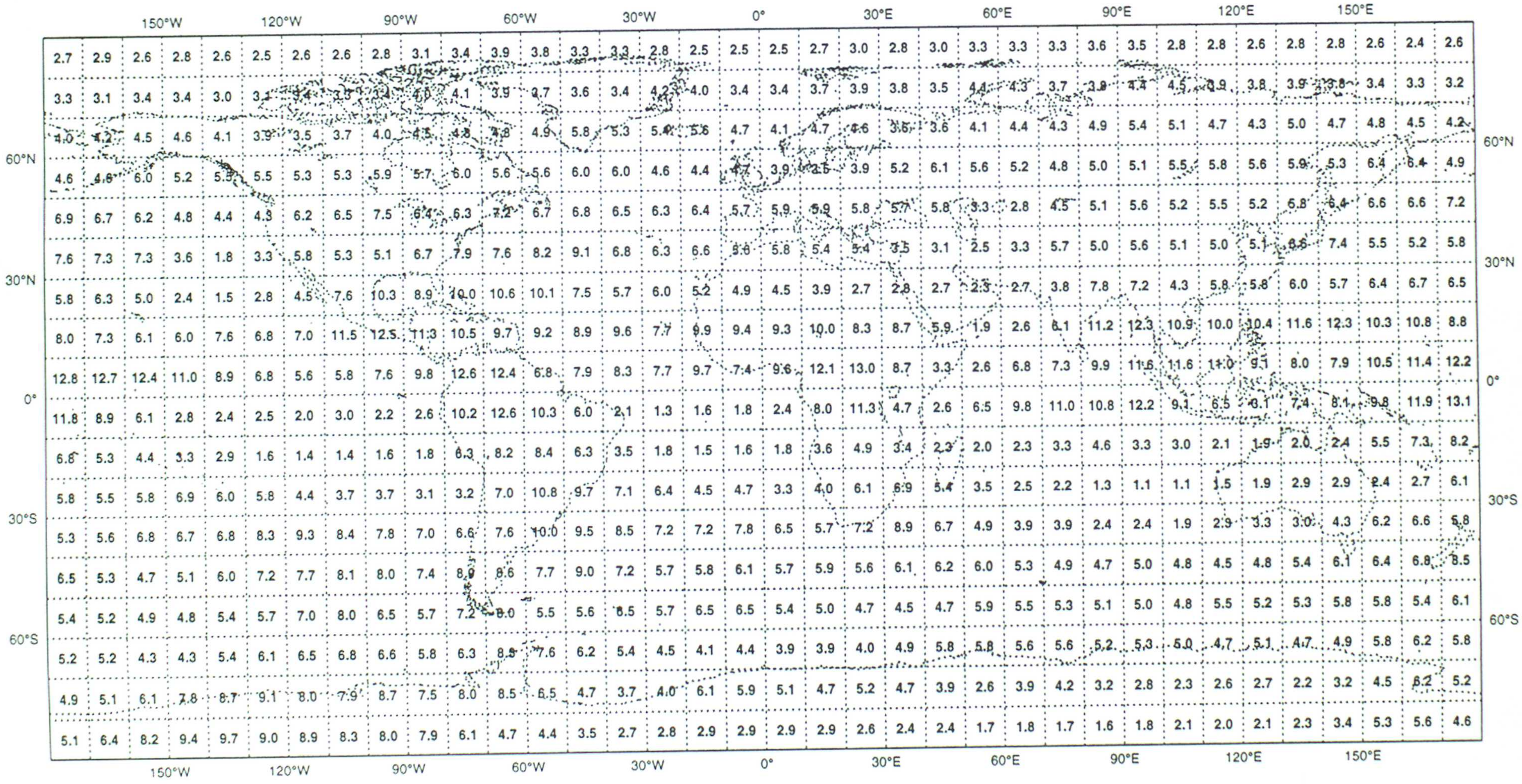
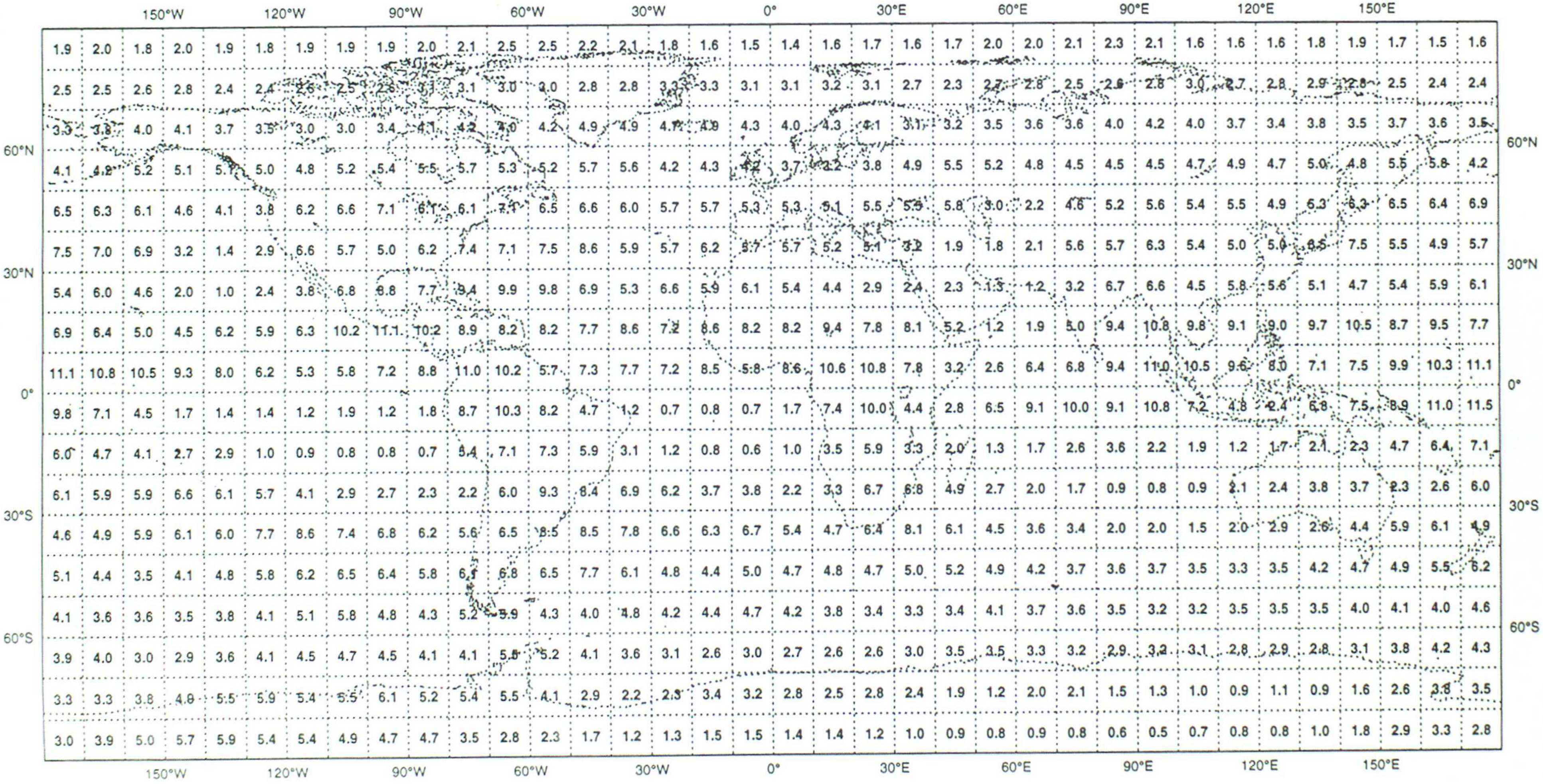
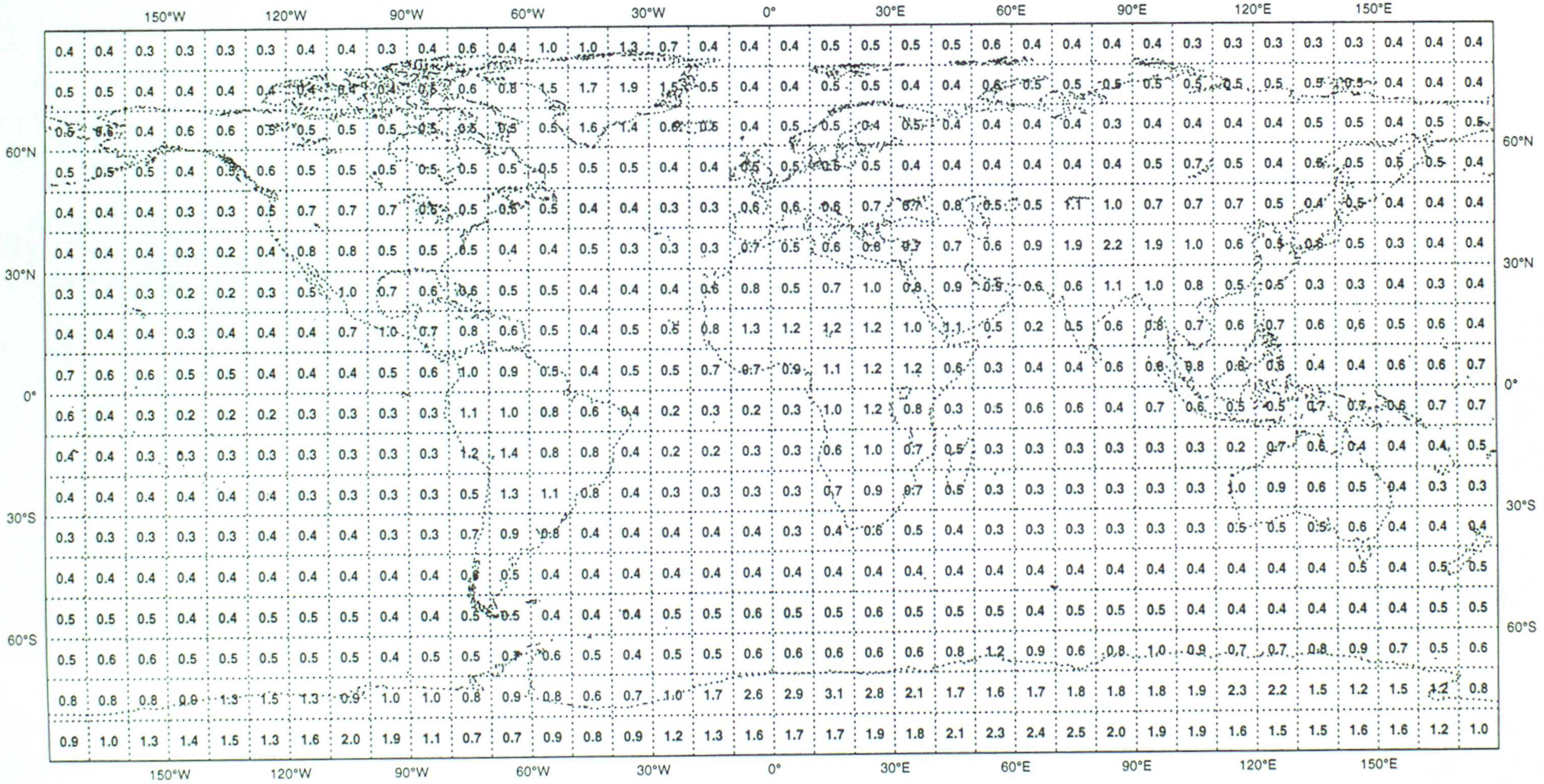

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
2.7 2.9 2.6 2.8 2.6 2.5 2.6 2.6 2.8 3.1 3.4 3.9 3.8 3.3 3.3 2.8 2.5 2.5 2.5 2.7 3.0 2.8 3.0 3.3 3.3 3.3 3.6 3.5 2.8 2.8 2.6 2.8 2.8 2.6 2.4 2.6
3.3 3.1 3.4 3.4 3.0 3.1 3.4 3.3 3.4 4.0 4.1 3.9 3.7 3.6 3.4 4.2 4.0 3.4 3.4 3.7 3.9 3.8 3.5 4.4 4.3 3.7 3.9 4.4 4.5 3.9 3.8 3.9 3.8 3.4 3.3 3.2
4.0 4.2 4.5 4.6 4.1 3.9 3.5 3.7 4.0 4.5 4.8 4.8 4.9 5.8 5.3 5.4 5.6 4.7 4.1 4.7 4.6 3.6 3.6 4.1 4.4 4.3 4.9 5.4 5.1 4.7 4.3 5.0 4.7 4.8 4.5 4.2
4.6 4.6 6.0 5.2 5.5 5.5 5.3 5.3 5.9 5.7 6.0 5.6 5.6 6.0 6.0 4.6 4.4 4.7 3.9 2.5 3.9 5.2 6.1 5.6 5.2 4.8 5.0 5.1 5.5 5.8 5.6 5.9 5.3 6.4 6.4 4.9
6.9 6.7 6.2 4.8 4.4 4.3 6.2 6.5 7.5 6.4 6.3 7.2 6.7 6.8 6.5 6.3 6.4 5.7 5.9 5.9 5.8 5.7 5.8 3.3 2.8 4.5 5.1 5.6 5.2 5.5 5.2 6.8 6.4 6.6 6.6 7.2
7.6 7.3 7.3 3.6 1.8 3.3 5.8 5.3 5.1 6.7 7.9 7.6 8.2 9.1 6.8 6.3 6.6 5.6 5.8 5.4 5.4 3.5 3.1 2.5 3.3 5.7 5.0 5.6 5.1 5.0 5.1 6.6 7.4 5.5 5.2 5.8
5.8 6.3 5.0 2.4 1.5 2.8 4.5 7.6 10.3 8.9 10.0 10.6 10.1 7.5 5.7 6.0 5.2 4.9 4.5 3.9 2.7 2.8 2.7 2.3 2.7 3.8 7.8 7.2 4.3 5.8 5.8 6.0 5.7 6.4 6.7 6.5
8.0 7.3 6.1 6.0 7.6 6.8 7.0 11.5 12.5 11.3 10.5 9.7 9.2 8.9 9.6 7.7 9.9 9.4 9.3 10.0 8.3 8.7 5.9 1.9 2.6 6.1 11.2 12.3 10.9 10.0 10.4 11.6 12.3 10.3 10.8 8.8
12.8 12.7 12.4 11.0 8.9 6.8 5.6 5.8 7.6 9.8 12.6 12.4 6.8 7.9 8.3 7.7 9.7 7.4 9.6 12.1 13.0 8.7 3.3 2.6 6.8 7.3 9.9 11.6 11.6 11.0 9.1 8.0 7.9 10.5 11.4 12.2
11.8 8.9 6.1 2.8 2.4 2.5 2.0 3.0 2.2 2.6 10.2 12.6 10.3 6.0 2.1 1.3 1.6 1.8 2.4 8.0 11.3 4.7 2.6 6.5 9.8 11.0 10.8 12.2 9.1 6.5 6.1 7.4 8.1 9.8 11.9 13.1
6.8 5.3 4.4 3.3 2.9 1.6 1.4 1.4 1.6 1.8 6.3 8.2 8.4 6.3 3.5 1.8 1.5 1.6 1.8 3.6 4.9 3.4 2.3 2.0 2.3 3.3 4.6 3.3 3.0 2.1 1.9 2.0 2.4 5.5 7.3 8.2
5.8 5.5 5.8 6.9 6.0 5.8 4.4 3.7 3.7 3.1 3.2 7.0 10.8 9.7 7.1 6.4 4.5 4.7 3.3 4.0 6.1 6.9 5.4 3.5 2.5 2.2 1.3 1.1 1.1 1.5 1.9 2.9 2.9 2.4 2.7 6.1
5.3 5.6 6.8 6.7 6.8 8.3 9.3 8.4 7.8 7.0 6.6 7.6 10.0 9.5 8.5 7.2 7.2 7.8 6.5 5.7 7.2 8.9 6.7 4.9 3.9 3.9 2.4 2.4 1.9 2.9 3.3 3.0 4.3 6.2 6.6 5.8
6.5 5.3 4.7 5.1 6.0 7.2 7.7 8.1 8.0 7.4 8.9 8.6 7.7 9.0 7.2 5.7 5.8 6.1 5.7 5.9 5.6 6.1 6.2 6.0 5.3 4.9 4.7 5.0 4.8 4.5 4.8 5.4 6.1 6.4 6.8 8.5
5.4 5.2 4.9 4.8 5.4 5.7 7.0 8.0 6.5 5.7 7.2 8.0 5.5 5.6 6.5 5.7 6.5 6.5 5.4 5.0 4.7 4.5 4.7 5.9 5.5 5.3 5.1 5.0 4.8 5.5 5.2 5.3 5.8 5.8 5.4 6.1
5.2 5.2 4.3 4.3 5.4 6.1 6.5 6.8 6.6 5.8 6.3 8.5 7.6 6.2 5.4 4.5 4.1 4.4 3.9 3.9 4.0 4.9 5.8 5.8 5.6 5.6 5.2 5.3 5.0 4.7 5.1 4.7 4.9 5.8 6.2 5.8
4.9 5.1 6.1 7.8 8.7 9.1 8.0 7.9 8.7 7.5 8.0 8.5 6.5 4.7 3.7 4.0 6.1 5.9 5.1 4.7 5.2 4.7 3.9 2.6 3.9 4.2 3.2 2.8 2.3 2.6 2.7 2.2 3.2 4.5 6.2 5.2
5.1 6.4 8.2 9.4 9.7 9.0 8.9 8.3 8.0 7.9 6.1 4.7 4.4 3.5 2.7 2.8 2.9 2.9 2.9 2.9 2.6 2.4 2.4 1.7 1.8 1.7 1.6 1.8 2.1 2.0 2.1 2.3 3.4 5.3 5.6 4.6

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



1.9	2.0	1.8	2.0	1.9	1.8	1.9	1.9	1.9	2.0	2.1	2.5	2.5	2.2	2.1	1.8	1.6	1.5	1.4	1.6	1.7	1.6	1.7	2.0	2.0	2.1	2.3	2.1	1.6	1.6	1.6	1.8	1.9	1.7	1.5	1.6
2.5	2.5	2.6	2.8	2.4	2.4	2.6	2.5	2.8	3.1	3.1	3.0	3.0	2.8	2.8	3.3	3.3	3.1	3.1	3.2	3.1	2.7	2.3	2.7	2.8	2.5	2.9	2.8	3.0	2.7	2.8	2.9	2.8	2.5	2.4	2.4
3.3	3.8	4.0	4.1	3.7	3.5	3.0	3.0	3.4	4.1	4.2	4.0	4.2	4.9	4.9	4.7	4.9	4.3	4.0	4.3	4.1	3.1	3.2	3.5	3.6	3.6	4.0	4.2	4.0	3.7	3.4	3.8	3.5	3.7	3.6	3.5
4.1	4.2	5.2	5.1	5.1	5.0	4.8	5.2	5.4	5.5	5.7	5.3	5.2	5.7	5.6	4.2	4.3	4.2	3.7	2.2	3.8	4.9	5.5	5.2	4.8	4.5	4.5	4.5	4.7	4.9	4.7	5.0	4.8	5.5	5.8	4.2
6.5	6.3	6.1	4.6	4.1	3.8	6.2	6.6	7.1	6.1	6.1	7.1	6.5	6.6	6.0	5.7	5.7	5.3	5.3	5.1	5.5	5.5	5.8	3.0	2.2	4.6	5.2	5.6	5.4	5.5	4.9	6.3	6.3	6.5	6.4	6.9
7.5	7.0	6.9	3.2	1.4	2.9	6.6	5.7	5.0	6.2	7.4	7.1	7.5	8.6	5.9	5.7	6.2	5.7	5.7	5.2	5.1	3.2	1.9	1.8	2.1	5.6	5.7	6.3	5.4	5.0	5.0	6.5	7.5	5.5	4.9	5.7
5.4	6.0	4.6	2.0	1.0	2.4	3.8	6.8	8.8	7.7	9.4	9.9	9.8	6.9	5.3	6.6	5.9	6.1	5.4	4.4	2.9	2.4	2.3	1.3	1.2	3.2	6.7	6.6	4.5	5.8	5.6	5.1	4.7	5.4	5.9	6.1
6.9	6.4	5.0	4.5	6.2	5.9	6.3	10.2	11.1	10.2	8.9	8.2	8.2	7.7	8.6	7.2	8.6	8.2	8.2	9.4	7.8	8.1	5.2	1.2	1.9	5.0	9.4	10.8	9.8	9.1	9.0	9.7	10.5	8.7	9.5	7.7
11.1	10.8	10.5	9.3	8.0	6.2	5.3	5.8	7.2	8.8	11.0	10.2	5.7	7.3	7.7	7.2	8.5	5.8	8.6	10.6	10.8	7.8	3.2	2.6	6.4	6.8	9.4	11.0	10.5	9.6	8.0	7.1	7.5	9.9	10.3	11.1
9.8	7.1	4.5	1.7	1.4	1.4	1.2	1.9	1.2	1.8	8.7	10.3	8.2	4.7	1.2	0.7	0.8	0.7	1.7	7.4	10.0	4.4	2.8	6.5	9.1	10.0	9.1	10.8	7.2	4.8	2.4	6.8	7.5	8.9	11.0	11.5
6.0	4.7	4.1	2.7	2.9	1.0	0.9	0.8	0.8	0.7	5.4	7.1	7.3	5.9	3.1	1.2	0.8	0.6	1.0	3.5	5.9	3.3	2.0	1.3	1.7	2.6	3.6	2.2	1.9	1.2	1.7	2.1	2.3	4.7	6.4	7.1
6.1	5.9	5.9	6.6	6.1	5.7	4.1	2.9	2.7	2.3	2.2	6.0	9.3	8.4	6.9	6.2	3.7	3.8	2.2	3.3	6.7	6.8	4.9	2.7	2.0	1.7	0.9	0.8	0.9	2.1	2.4	3.8	3.7	2.3	2.6	6.0
4.6	4.9	5.9	6.1	6.0	7.7	8.6	7.4	6.8	6.2	5.6	6.5	8.5	8.5	7.8	6.6	6.3	6.7	5.4	4.7	6.4	8.1	6.1	4.5	3.6	3.4	2.0	2.0	1.5	2.0	2.9	2.6	4.4	5.9	6.1	4.9
5.1	4.4	3.5	4.1	4.8	5.8	6.2	6.5	6.4	5.8	6.1	6.8	6.5	7.7	6.1	4.8	4.4	5.0	4.7	4.8	4.7	5.0	5.2	4.9	4.2	3.7	3.6	3.7	3.5	3.3	3.5	4.2	4.7	4.9	5.5	6.2
4.1	3.6	3.6	3.5	3.8	4.1	5.1	5.8	4.8	4.3	5.2	5.9	4.3	4.0	4.8	4.2	4.4	4.7	4.2	3.8	3.4	3.3	3.4	4.1	3.7	3.6	3.5	3.2	3.2	3.5	3.5	3.5	4.0	4.1	4.0	4.6
3.9	4.0	3.0	2.9	3.6	4.1	4.5	4.7	4.5	4.1	4.1	5.5	5.2	4.1	3.6	3.1	2.6	3.0	2.7	2.6	2.6	3.0	3.5	3.5	3.3	3.2	2.9	3.2	3.1	2.8	2.9	2.8	3.1	3.8	4.2	4.3
3.3	3.3	3.8	4.8	5.5	5.9	5.4	5.5	6.1	5.2	5.4	5.5	4.1	2.9	2.2	2.3	3.4	3.2	2.8	2.5	2.8	2.4	1.9	1.2	2.0	2.1	1.5	1.3	1.0	0.9	1.1	0.9	1.6	2.6	3.8	3.5
3.0	3.9	5.0	5.7	5.9	5.4	5.4	4.9	4.7	4.7	3.5	2.8	2.3	1.7	1.2	1.3	1.5	1.5	1.4	1.4	1.2	1.0	0.9	0.8	0.9	0.8	0.6	0.5	0.7	0.8	0.8	1.0	1.8	2.9	3.3	2.8

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.6	0.4	1.0	1.0	1.3	0.7	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.8	1.5	1.7	1.9	1.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
0.5	0.6	0.4	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.6	1.4	0.6	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.5
0.5	0.5	0.5	0.4	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.7	0.5	0.4	0.6	0.5	0.5	0.5	0.4
0.4	0.4	0.4	0.3	0.3	0.5	0.7	0.7	0.7	0.6	0.5	0.5	0.5	0.4	0.4	0.3	0.3	0.6	0.6	0.6	0.7	0.7	0.8	0.5	0.5	1.1	1.0	0.7	0.7	0.7	0.5	0.4	0.5	0.4	0.4	0.4
0.4	0.4	0.4	0.3	0.2	0.4	0.8	0.8	0.5	0.5	0.5	0.4	0.4	0.5	0.3	0.3	0.3	0.7	0.5	0.6	0.6	0.7	0.7	0.6	0.9	1.9	2.2	1.9	1.0	0.6	0.5	0.6	0.5	0.3	0.4	0.4
0.3	0.4	0.3	0.2	0.2	0.3	0.5	1.0	0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.6	0.8	0.5	0.7	1.0	0.8	0.9	0.9	0.6	0.6	1.1	1.0	0.8	0.5	0.5	0.3	0.3	0.4	0.3	0.4
0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.7	1.0	0.7	0.8	0.6	0.5	0.4	0.5	0.5	0.8	1.3	1.2	1.2	1.2	1.0	1.1	0.5	0.2	0.5	0.6	0.8	0.7	0.6	0.7	0.6	0.6	0.5	0.6	0.4
0.7	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.5	0.6	1.0	0.9	0.5	0.4	0.5	0.5	0.7	0.7	0.9	1.1	1.2	1.2	0.6	0.3	0.4	0.4	0.6	0.8	0.8	0.8	0.8	0.4	0.4	0.6	0.6	0.7
0.6	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.1	1.0	0.8	0.6	0.4	0.2	0.3	0.2	0.3	1.0	1.2	0.8	0.3	0.5	0.6	0.6	0.4	0.7	0.6	0.5	0.5	0.7	0.7	0.6	0.7	0.7
0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	1.2	1.4	0.8	0.8	0.4	0.2	0.2	0.3	0.3	0.6	1.0	0.7	0.5	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.7	0.6	0.4	0.4	0.4	0.5
0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.5	1.3	1.1	0.8	0.4	0.3	0.3	0.3	0.3	0.7	0.9	0.7	0.5	0.3	0.3	0.3	0.3	0.3	0.3	1.0	0.9	0.6	0.5	0.4	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.7	0.9	0.8	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.5	0.5	0.5	0.6	0.4	0.4	0.4
0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.5
0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.7	0.6	0.5	0.4	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.8	1.2	0.9	0.6	0.8	1.0	0.9	0.7	0.7	0.8	0.9	0.7	0.5	0.6
0.8	0.8	0.8	0.8	1.3	1.5	1.3	0.9	1.0	1.0	0.8	0.9	0.8	0.6	0.7	1.0	1.7	2.6	2.9	3.1	2.8	2.1	1.7	1.6	1.7	1.8	1.8	1.8	1.9	2.3	2.2	1.5	1.2	1.5	1.2	0.8
0.9	1.0	1.3	1.4	1.5	1.3	1.6	2.0	1.9	1.1	0.7	0.7	0.9	0.8	0.9	1.2	1.3	1.6	1.7	1.7	1.9	1.8	2.1	2.3	2.4	2.5	2.0	1.9	1.9	1.6	1.5	1.5	1.6	1.6	1.2	1.0

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

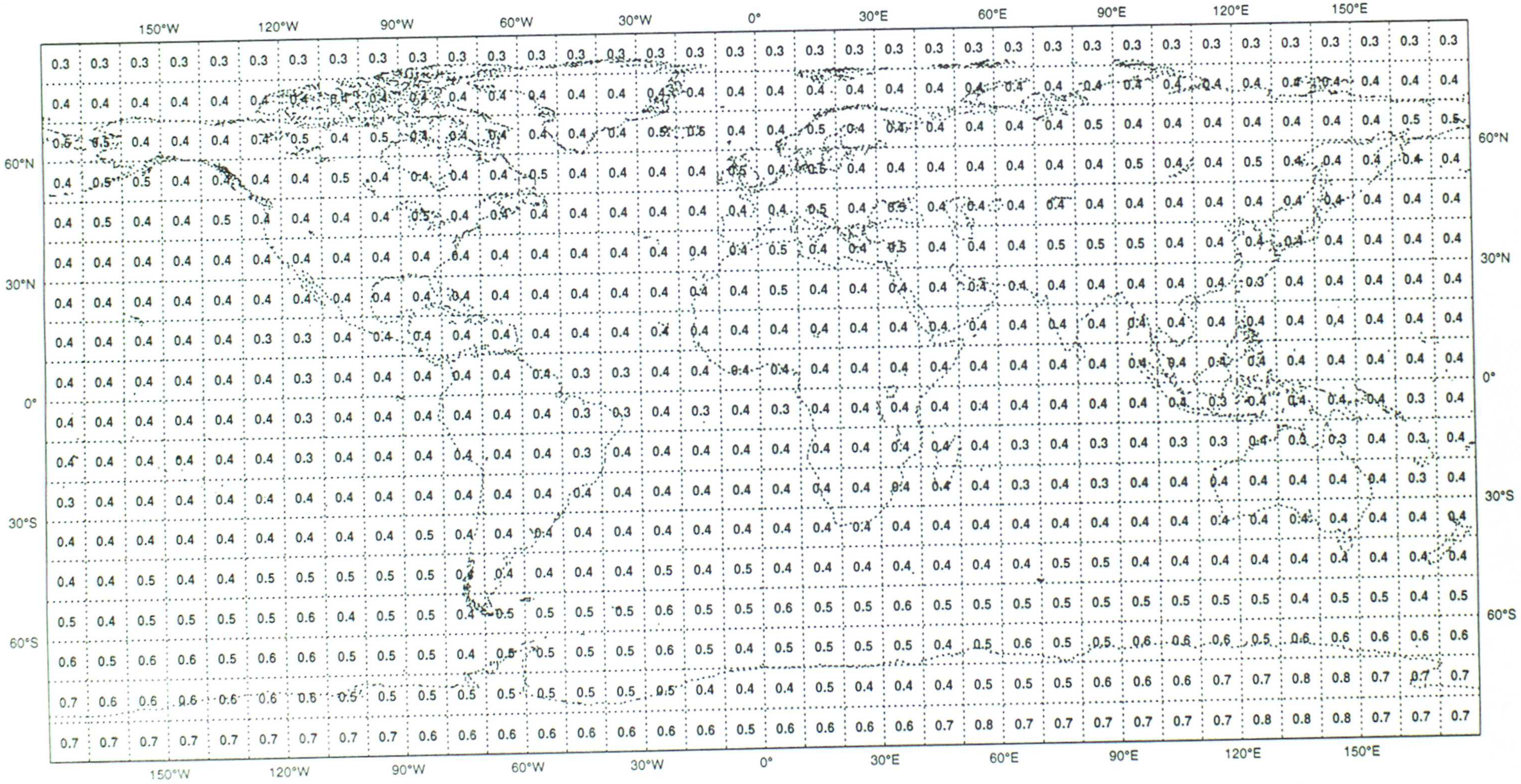
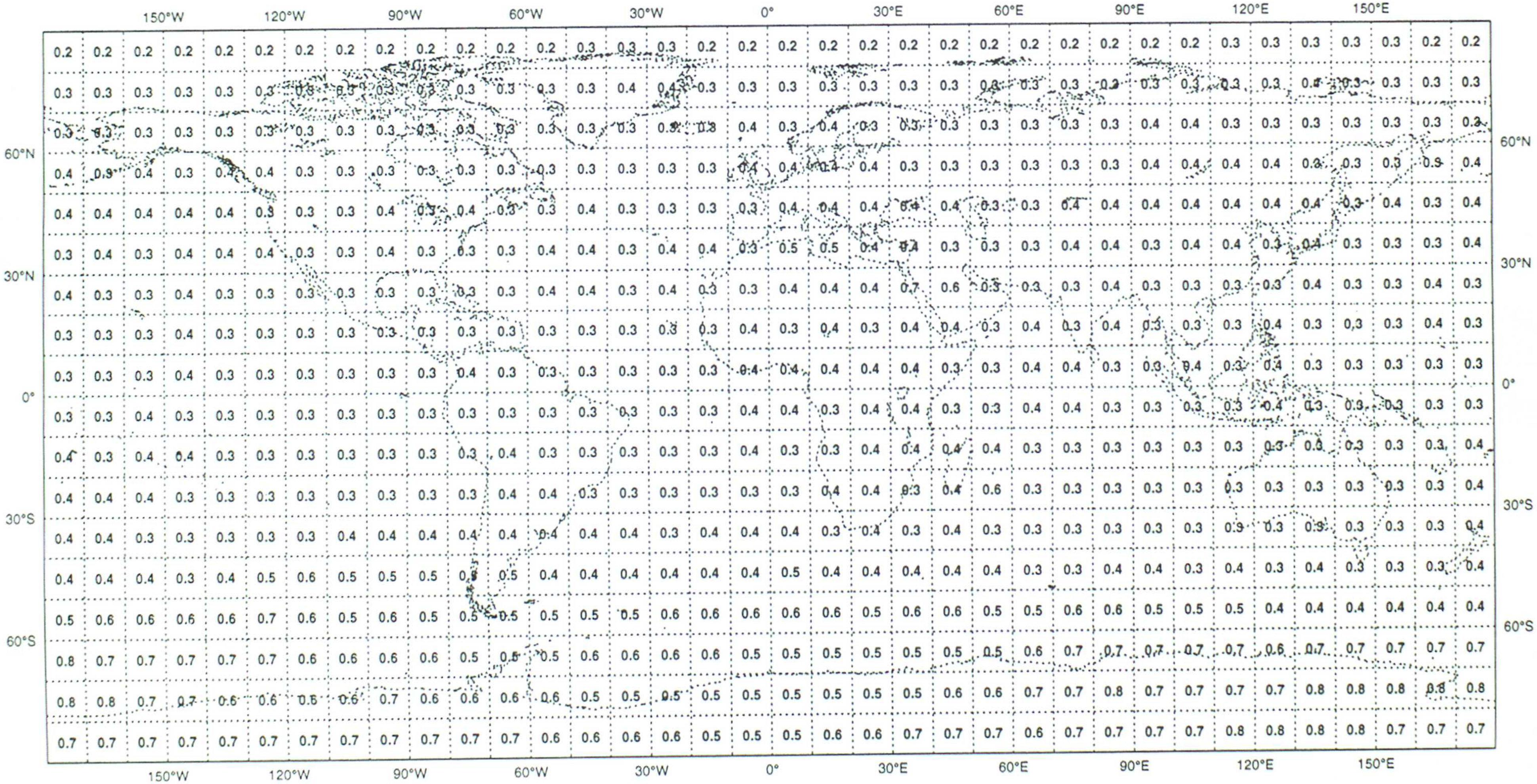

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). SEPTEMBER 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations



0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.2
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3
0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
0.4	0.3	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4
0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.4
0.3	0.4	0.3	0.4	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.5	0.5	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.4
0.4	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.7	0.6	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.3
0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.4	0.3
0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3
0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3
0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.6	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4
0.4	0.4	0.4	0.3	0.4	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.4
0.5	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4
0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7
0.8	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8
0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.7

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored
:Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS	:Number of observations received excluding duplicates.
:NGE	:Number of observations with gross errors.
:PGE	:Percentage of observations with gross errors.
:SD	:SD of difference of observations from background values excluding those with gross errors.
:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. A positive bias indicates the wind observation is veered to the background**
:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS
:15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
25806352	48.3	-64.6	P	1	0	0	0.0	0.2	0.2
41503	22.5	-46.1	P	582	0	1	0.7	-0.3	0.7
41522	18.1	-44.6	P	577	0	1	0.6	0.0	0.6
41523	26.7	-46.2	P	367	0	34	0.6	0.5	0.8
41531	28.2	-75.9	P	610	0	1	0.5	1.3	1.4
41532	22.6	-73.4	P	613	0	1	0.5	1.0	1.1
41533	27.3	-76.0	P	608	0	1	0.5	0.1	0.5
41534	23.2	-73.5	P	607	0	0	0.5	1.1	1.2
41536	21.6	-68.5	P	612	0	1	0.7	1.0	1.2
41537	27.2	-70.3	P	611	0	1	0.6	0.8	1.0
41556	19.6	-80.0	P	211	0	0	0.5	-0.6	0.8
41557	25.9	-74.8	P	648	0	0	0.5	-0.2	0.5
41559	27.7	-76.8	P	479	0	1	0.5	-0.4	0.6
41561	23.1	-63.3	P	464	0	0	0.5	-0.7	0.9
41563	21.5	-54.4	P	354	0	0	0.7	-0.5	0.9
41577	35.6	-75.5	P	653	0	3	0.9	0.6	1.1
41630	35.8	-75.6	P	201	0	2	0.9	0.6	1.1
41640	40.7	-48.1	P	662	0	3	0.9	1.6	1.8
41641	30.4	-81.4	P	393	0	8	1.2	1.6	2.0
41645	29.5	-75.3	P	608	0	3	0.7	0.2	0.7
41647	24.5	-68.3	P	735	0	22	0.5	0.1	0.5
41648	24.5	-70.9	P	612	0	1	0.5	0.3	0.6
41649	10.2	-52.4	P	557	0	1	0.6	-1.1	1.2
41650	28.2	-66.0	P	609	0	1	0.6	0.7	1.0
41652	29.4	-67.6	P	588	0	0	0.7	0.3	0.7
41656	32.1	-80.8	P	372	0	2	0.7	0.6	0.9
41658	36.9	-52.6	P	676	0	8	1.0	-0.6	1.2
41659	34.4	-33.1	P	634	0	0	0.5	0.5	0.7
41666	35.8	-49.1	P	638	0	3	0.8	0.3	0.9
41667	26.7	-75.4	P	620	0	3	0.9	0.7	1.1
44504	49.9	-42.2	P	459	0	14	0.7	-0.3	0.8
44511	43.9	-38.9	P	247	21	36	3.3	0.6	3.4
44517	44.9	-38.5	P	256	16	27	3.9	-0.8	4.0
44549	57.0	-19.4	P	1277	0	45	0.5	-0.5	0.8
44550	55.8	-18.3	P	1235	0	44	0.7	-0.1	0.7
44601	38.0	-39.4	P	815	0	26	0.5	-0.3	0.5
44602	44.4	-52.7	P	1	100	100			
44606	35.1	-51.5	P	741	0	6	0.8	0.6	1.0
44607	39.8	-42.2	P	678	0	0	0.8	-0.3	0.8
44608	42.3	-43.2	P	702	0	1	0.7	0.7	1.0
44609	50.8	-39.9	P	750	0	8	0.9	-0.7	1.1
44610	45.7	-49.3	P	701	0	2	0.8	-0.6	0.9
44611	52.8	-45.2	P	85	0	0	0.8	-0.2	0.8
44616	41.3	-21.0	P	720	0	5	0.7	-0.4	0.8
44624	39.9	-17.8	P	705	0	1	0.7	0.1	0.7
44625	31.5	-21.1	P	716	0	1	0.5	-0.1	0.5
44627	39.8	-24.3	P	723	0	18	0.8	-0.3	0.8
44721	31.0	-44.4	P	713	0	2	0.5	0.0	0.5
44723	44.2	-21.9	P	701	0	2	0.9	0.4	0.9
44726	58.4	-39.6	P	1260	0	44	0.7	0.1	0.7
44730	59.3	-16.1	P	1645	0	58	0.5	0.1	0.6
44743	62.6	-17.8	P	995	1	59	0.8	0.0	0.8
44763	42.9	-23.5	P	784	0	12	0.6	0.1	0.6
44764	52.0	-29.7	P	694	0	2	1.1	-0.3	1.1
44767	52.1	-34.5	P	630	0	1	1.0	0.1	1.1
44769	55.1	-37.4	P	689	0	2	1.0	0.0	1.0
44770	53.9	-39.3	P	638	0	2	1.2	-0.5	1.3
44772	58.1	-36.5	P	647	0	1	0.9	-0.3	1.0
44773	46.2	-29.1	P	686	0	3	1.2	0.5	1.3
44775	32.9	-44.9	P	711	0	1	0.5	-0.5	0.7

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
44780	56.8	-22.5	P	538	0	35	0.5	0.0	0.5
62501	33.8	-40.7	P	692	0	1	0.5	0.1	0.5
62502	49.0	-20.8	P	650	0	1	0.7	-0.2	0.7
62503	26.8	-39.0	P	707	0	1	0.5	-0.6	0.8
62504	33.4	-16.8	P	660	0	1	0.6	-0.1	0.6
62505	54.0	-34.0	P	1047	0	38	0.8	-0.1	0.8
62506	45.8	-15.0	P	1001	0	33	0.8	-0.7	1.0
62507	51.2	-17.6	P	696	0	2	0.6	-0.3	0.6
62508	44.3	-15.9	P	689	0	2	0.8	0.0	0.8
62509	52.5	-20.1	P	677	0	2	0.6	0.7	1.0
62512	41.5	-14.3	P	887	0	24	0.7	-0.1	0.7
62513	37.3	-31.4	P	178	0	1	0.9	0.6	1.1
62514	34.6	-35.2	P	314	0	46	0.5	0.0	0.5
62515	34.8	-28.2	P	348	0	1	0.6	0.0	0.6
62517	32.9	-26.0	P	427	0	0	0.5	-0.2	0.5
62519	43.5	-11.9	P	15	0	0	0.6	0.1	0.6
62573	46.0	-6.5	P	649	1	33	0.9	0.1	0.9
62696	55.0	-20.9	P	1185	0	41	0.6	-0.4	0.7
62711	62.0	-29.9	P	1045	0	37	0.8	0.2	0.8
62712	56.7	-34.7	P	700	0	1	0.9	0.2	0.9
64553	59.5	-17.2	P	707	0	42	0.8	-0.1	0.8
65517	58.8	-42.7	P	692	0	3	1.3	0.6	1.5
WIND SPEED									
41503	22.5	-46.1	SPEED	580	0	100	1.3	-0.6	1.4
41522	18.1	-44.6	SPEED	577	0	100	1.5	0.0	1.5
41531	28.2	-75.9	SPEED	607	0	100	2.4	0.5	2.4
41532	22.6	-73.4	SPEED	611	1	100	3.8	1.9	4.2
41533	27.3	-76.0	SPEED	608	0	100	2.2	0.3	2.2
41534	23.2	-73.5	SPEED	605	0	100	2.0	0.1	2.0
41536	21.6	-68.5	SPEED	606	1	100	2.2	-0.3	2.3
41537	27.2	-70.3	SPEED	608	0	100	2.6	0.2	2.6
41556	19.6	-80.0	SPEED	208	0	100	1.5	-1.9	2.4
41559	27.7	-76.8	SPEED	468	0	100	2.9	1.1	3.0
41561	23.1	-63.3	SPEED	463	0	100	1.6	0.6	1.7
41563	21.5	-54.4	SPEED	345	2	100	3.6	3.0	4.7
41645	29.5	-75.3	SPEED	495	0	100	2.3	-3.8	4.4
41647	24.5	-68.3	SPEED	732	0	100	2.1	0.2	2.1
41648	24.5	-70.9	SPEED	608	1	100	2.2	0.3	2.2
41649	10.2	-52.4	SPEED	556	0	100	2.2	0.9	2.4
41652	29.4	-67.6	SPEED	582	1	100	3.6	0.9	3.7
41667	26.7	-75.4	SPEED	602	2	100	3.9	-0.9	4.0
44601	38.0	-39.4	SPEED	806	0	100	2.0	0.9	2.2
44602	44.4	-52.7	SPEED	640	0	100	2.4	1.4	2.8
62502	49.0	-20.8	SPEED	644	0	100	2.2	1.1	2.5
62573	46.0	-6.5	SPEED	630	0	100	2.6	-0.4	2.6
62711	62.0	-29.9	SPEED	1043	0	100	2.1	1.5	2.6
WIND DIRECTION									
41503	22.5	-46.1	DIRN.	229	0	0	14.4	7.9	16.4
41522	18.1	-44.6	DIRN.	371	0	0	12.3	-0.2	12.3
41531	28.2	-75.9	DIRN.	182	1	0	17.8	4.3	18.3
41532	22.6	-73.4	DIRN.	405	2	0	18.8	17.7	25.8
41533	27.3	-76.0	DIRN.	199	2	0	14.4	4.8	15.2
41534	23.2	-73.5	DIRN.	296	0	0	15.8	23.3	28.1
41536	21.6	-68.5	DIRN.	222	3	0	36.0	49.2	61.0
41537	27.2	-70.3	DIRN.	199	1	0	24.5	-14.1	28.3
41559	27.7	-76.8	DIRN.	199	1	0	27.2	4.5	27.6
41561	23.1	-63.3	DIRN.	131	0	0	28.4	-6.9	29.3

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND DIRECTION									
41563	21.5	-54.4	DIRN.	162	4	0	38.7	9.5	39.9
41647	24.5	-68.3	DIRN.	288	0	0	25.8	1.6	25.9
41648	24.5	-70.9	DIRN.	199	2	0	20.3	63.4	66.6
41649	10.2	-52.4	DIRN.	197	1	0	32.7	-3.0	32.8
41652	29.4	-67.6	DIRN.	251	2	0	25.9	-7.5	27.0
41667	26.7	-75.4	DIRN.	121	10	0	18.1	35.2	39.5
44601	38.0	-39.4	DIRN.	465	0	0	14.2	0.9	14.2
44602	44.4	-52.7	DIRN.	419	0	0	20.2	6.1	21.1
62502	49.0	-20.8	DIRN.	561	0	0	16.5	-5.0	17.2
62573	46.0	-6.5	DIRN.	457	0	0	20.7	2.8	20.9
62711	62.0	-29.9	DIRN.	806	0	0	17.8	-4.2	18.3

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures:

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :40°N - 70°N, 60°W - 0°W.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in $m\ s^{-1}$

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 $m\ s^{-1}$ Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
			TEMPERATURE					WIND			
AAL	1291	2	9	1.9	0.4	1166	0	7	0	8.3	0.4
AAR	29	3	7	2.1	0.3	29	0	3	0	7.4	-0.3
ACA	1993	0	2	1.6	-0.2	1960	0	4	0	7.5	0.3
AEA	190	0	5	1.4	0.4	67	0	7	0	6.1	0.9
AEL	374	0	11	1.6	-0.9	273	0	11	0	6.7	0.2
AFL	396	2	3	1.6	0.6	390	0	5	0	8.6	-0.2
AFR	806	0	8	1.6	0.2	653	0	9	0	7.4	0.8
AIS	139	4	12	1.6	-0.8	124	1	15	0	8.5	0.2
AJM	311	0	2	1.2	-0.2	267	0	2	0	6.9	0.7
AMM	71	1	13	1.7	0.3	53	0	15	0	7.2	0.5
AMX	254	1	4	1.4	0.1	184	0	6	0	8.8	0.2
AUA	30	0	3	1.2	0.0	29	0	7	0	6.8	0.3
AZA	485	2	11	2.2	0.4	448	0	5	0	8.4	0.3
BAL	137	0	11	1.3	0.5	116	0	12	0	6.0	0.3
BAW	522	0	14	1.6	-0.7	505	0	16	0	7.1	0.1
BSK	38	3	8	2.6	0.6	36	0	22	0	12.9	0.7
BWA	60	0	0	1.5	0.3	34	0	3	0	8.4	1.3
CFG	390	1	5	1.8	-0.4	343	0	5	0	7.6	0.3
CGA	36	0	0	1.1	-0.2	35	0	0	0	4.9	1.0
CGF	37	0	3	1.5	-0.3	36	0	3	0	4.3	0.2
CGH	92	0	2	1.7	-0.4	92	0	1	0	5.4	0.9
CIU	23	0	17	1.7	-0.2	21	0	48	0	16.1	3.8
CLX	254	0	2	1.8	-0.4	254	0	4	0	7.2	-0.2
COA	166	0	28	1.7	0.2	99	0	30	0	8.6	0.6
CRL	176	1	2	1.4	0.3	139	1	6	0	9.1	1.2
CUB	207	0	6	1.5	0.7	155	1	9	0	8.2	0.5
DAB	118	0	5	1.2	-0.1	114	0	5	0	4.8	0.4
DAI	108	0	0	0.9	0.1	104	0	0	0	4.5	0.8
DAL	1238	0	17	1.4	-0.3	1099	0	19	0	8.4	0.4
DBR	29	3	3	1.0	-0.3	29	0	3	0	5.9	0.1
DCE	95	0	11	1.4	0.5	82	0	13	0	8.0	-0.1
DCS	32	9	16	1.4	-0.4	32	0	6	0	6.2	1.5
DHL	39	0	100	6.5	-6.4	35	0	20	0	11.6	0.3
DLH	864	0	11	1.4	0.2	847	0	11	0	6.3	0.5
EDW	68	0	6	2.0	0.3	61	0	2	0	5.5	1.6
EIA	201	1	10	2.6	1.1	193	0	100	0	20.1	5.8
ELY	172	1	2	1.5	0.3	171	0	4	0	8.8	0.3
ETH	56	0	7	1.5	0.6	57	2	12	0	9.6	1.9
EWW	76	0	4	1.1	0.5	77	0	8	0	8.7	-0.6
FDX	624	0	39	1.3	0.3	624	0	41	0	7.8	0.6
FGS	96	0	1	1.3	0.5	92	0	1	0	5.7	0.9
FGZ	39	0	3	1.9	-0.3	37	0	0	0	5.2	1.0
FIN	211	0	6	1.7	0.2	207	1	6	0	6.5	0.2
GAF	75	0	4	1.9	-1.2	76	1	11	0	8.2	1.7
GCO	170	0	6	1.4	0.3	176	0	100	0	10.1	0.3
GRL	42	0	2	1.9	-0.1	44	0	2	0	6.1	0.6
GTI	98	1	15	2.0	-0.1	96	0	13	0	6.7	1.3
GVF	21	0	0	1.0	-0.7	20	0	0	0	5.7	2.6
GVR	31	0	3	1.5	-0.2	30	0	0	0	7.9	3.3
GWW	53	0	2	1.3	-0.2	52	0	2	0	5.2	1.2
IBE	1155	0	6	1.7	0.5	689	0	8	0	7.9	0.2
ICE	872	0	2	1.4	-0.1	856	0	4	0	7.9	0.0
IWD	107	0	1	1.6	0.0	29	0	3	0	6.6	-0.1
JMC	29	0	3	2.3	0.8	24	0	0	0	5.8	2.3
KLM	1145	0	3	1.6	0.1	944	0	5	0	7.7	0.4
LDA	38	0	0	1.1	-0.2	29	0	0	0	5.2	1.6
LDI	373	0	5	1.8	-0.1	296	0	5	0	7.4	0.6
LIB	179	1	9	1.7	0.9	104	1	7	0	6.1	0.4
LOT	187	1	5	1.8	-1.0	181	1	8	0	9.5	-0.4

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
LTU	548	2	7	1.5	-0.1	460	0	5	0	6.5	0.6
LXR	27	0	4	1.4	0.4	21	0	10	0	7.1	-0.5
MAS	36	0	6	1.2	-0.1	36	0	6	0	6.2	1.6
MON	40	3	8	1.8	0.5	30	0	13	0	9.1	0.7
MPD	179	1	5	1.6	0.0	87	0	7	0	9.8	0.2
MPH	477	0	1	1.6	-0.5	444	0	3	0	7.8	0.3
MYT	209	1	2	1.3	-0.1	179	1	6	0	9.2	1.2
NCA	26	0	0	1.6	0.8	26	0	0	0	4.6	0.2
NWA	3737	0	4	1.7	0.4	3767	0	4	0	7.6	0.2
PAC	309	1	8	1.9	0.3	316	0	8	0	8.8	0.1
RAM	210	0	0	1.3	0.2	118	0	4	0	8.3	0.5
RCH	239	2	100	3.0	0.6	216	0	100	0	13.4	2.7
RRR	133	1	10	1.6	0.3	130	0	11	0	8.1	0.9
RZO	156	1	2	2.0	0.3	114	0	2	0	7.3	0.6
SLR	129	0	9	1.1	0.4	118	0	13	0	9.5	0.0
SSV	55	0	5	2.0	0.3	59	0	5	0	6.3	0.8
SVA	26	0	8	1.6	0.0	29	0	21	0	9.4	1.1
TAG	37	0	8	1.4	0.2	36	0	14	0	8.6	0.7
TAP	286	0	5	1.5	-0.3	123	0	7	0	8.6	0.8
TSC	311	1	2	1.5	0.0	295	0	4	0	8.8	1.1
UAL	303	2	72	1.8	-0.9	301	0	76	0	9.1	0.2
UPS	1185	1	44	1.6	0.2	1168	0	44	0	7.6	0.5
USA	155	0	2	1.4	0.1	115	1	6	0	9.7	0.9
VIR	176	1	2	1.7	0.1	176	0	2	0	7.5	0.7
WOA	160	3	11	2.0	0.2	157	1	15	0	9.8	1.6
9VS	70	0	0	1.2	0.0	68	0	0	0	4.6	1.1
EU	32945	0	22	1.2	0.1	32945	0	22	0	4.6	0.5
KL	407	0	15	1.5	1.1	404	0	14	0	4.7	0.9
LH	453	0	13	1.3	0.9	453	0	13	0	4.4	0.5
TN	24	4	13	2.1	0.6	22	5	18	0	10.7	2.3
N	1467	1	11	1.7	0.2	1446	0	11	0	6.2	1.0
US ACARS	50027	5	49	1.3	0.3	50027	0	45	0	5.3	0.4

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	100	1	0	0.0	19.0	19.0
DBBH	00	Z	100	21	0	9.4	10.8	5.4
DBBH	12	Z	100	20	0	13.1	31.9	29.0
DBLK	12	Z	100	14	0	10.4	21.7	19.1
ELML7	00	Z	100	19	0	12.3	27.2	24.2
ELML7	12	Z	100	20	0	16.9	39.0	35.1
FNOR	00	Z	100	11	0	14.3	19.7	-13.5
FNOR	12	Z	100	11	0	27.6	27.8	2.5
FNOU	00	Z	100	12	0	19.6	19.9	-3.3
FNOU	12	Z	100	11	0	18.4	18.4	0.2
FNPH	00	Z	100	8	0	14.0	16.5	-8.9
FNPH	12	Z	100	7	0	17.7	20.8	11.0
FNRS	00	Z	100	12	0	9.6	14.2	-10.5
FNRS	12	Z	100	10	0	9.6	10.4	4.1
LDWR	00	Z	100	29	0	14.9	26.5	21.9
LDWR	12	Z	100	28	0	11.0	11.1	0.4
OVYA2	00	Z	100	2	0	2.5	2.9	1.5
OVYA2	12	Z	100	2	0	1.5	14.6	14.5
OXYH2	00	Z	100	5	0	3.9	21.2	20.8
OXYH2	12	Z	100	6	0	9.6	24.6	22.7
TOULOUS	00	Z	100	18	0	7.1	42.3	41.7
TOULOUS	12	Z	100	19	0	13.7	32.0	28.9
V2XO	00	Z	100	3	0	14.0	40.5	38.0
V2XO	12	Z	100	3	0	22.7	42.8	36.3
WPKD	00	Z	100	11	1	71.1	75.5	-25.4
WPKD	12	Z	100	11	0	32.2	36.2	16.5
ZCBP6	00	Z	100	6	0	15.3	27.1	22.3
ZCBP6	12	Z	100	5	0	11.9	38.7	36.8
03953	00	Z	100	28	0	10.9	37.0	35.4
03953	12	Z	100	30	0	11.0	41.4	39.9
04018	00	Z	100	29	0	17.1	27.8	21.9
04018	12	Z	100	29	0	12.7	35.6	33.3
04220	00	Z	100	27	0	17.5	18.8	6.8
04220	12	Z	100	30	0	19.7	21.2	7.8
04270	00	Z	100	26	0	12.2	20.9	17.0
04270	12	Z	100	26	0	13.7	23.7	19.3
04339	00	Z	100	26	0	13.6	20.0	14.7
04339	12	Z	100	30	0	11.2	20.2	16.8
04360	00	Z	100	27	0	11.9	16.3	11.1
04360	12	Z	100	30	0	13.0	18.5	13.1
08001	00	Z	100	28	0	20.6	20.8	2.5
08001	12	Z	100	26	0	20.6	20.9	3.2
08508	00	Z	100	28	0	11.7	26.3	23.6
08508	12	Z	100	30	0	11.5	40.9	39.3
08522	00	Z	100	28	0	11.6	25.1	22.3
08522	12	Z	100	30	0	24.4	42.1	34.3
08594	12	Z	100	19	0	16.1	21.8	14.6
60020	00	Z	100	29	0	14.3	23.4	18.6
60020	12	Z	100	26	0	12.1	33.7	31.4
71600	00	Z	100	29	0	12.2	12.4	2.6
71600	12	Z	100	30	0	13.1	14.5	6.1
72201	00	Z	100	29	0	12.5	13.7	5.7
72201	12	Z	100	30	0	12.7	28.3	25.3
72402	00	Z	100	27	0	12.0	27.2	24.4
72402	12	Z	100	30	0	24.0	52.6	46.8
74494	00	Z	100	27	0	10.6	13.3	8.0
74494	12	Z	100	25	0	15.7	16.4	4.8
78016	00	Z	100	29	0	11.4	28.3	25.9
78016	12	Z	100	30	0	16.8	33.8	29.4

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP1	12	Z	500	1	0	0.0	0.0	0.0
DBBH	00	Z	500	22	0	9.5	10.7	-5.0
DBBH	12	Z	500	22	0	10.5	11.3	4.2
DBLK	12	Z	500	13	1	7.2	9.2	5.7
ELML7	00	Z	500	19	0	7.5	7.5	0.0
ELML7	12	Z	500	21	0	9.3	11.8	7.2
FNOR	00	Z	500	12	0	9.2	11.6	-7.0
FNOR	12	Z	500	13	0	17.4	17.4	0.5
FNOU	00	Z	500	13	0	13.5	13.7	-2.0
FNOU	12	Z	500	11	0	7.0	7.0	0.5
FNPH	00	Z	500	9	0	7.9	11.9	-8.9
FNPH	12	Z	500	10	0	9.9	9.9	-1.3
FNRS	00	Z	500	12	0	12.0	16.5	-11.3
FNRS	12	Z	500	10	0	6.0	6.0	-0.4
LDWR	00	Z	500	29	0	22.6	27.3	15.3
LDWR	12	Z	500	28	0	14.0	14.1	1.9
OVYA2	00	Z	500	2	0	7.5	12.1	-9.5
OVYA2	12	Z	500	2	0	13.0	14.3	6.0
OXYH2	00	Z	500	5	0	9.9	15.9	12.4
OXYH2	12	Z	500	6	0	8.9	15.4	12.5
TOULOUS	00	Z	500	18	0	4.8	6.5	4.4
TOULOUS	12	Z	500	19	0	9.8	10.2	2.7
V2XO	00	Z	500	3	0	1.9	2.3	1.3
V2XO	12	Z	500	3	0	15.4	19.3	11.7
WPKD	00	Z	500	10	3	51.3	57.7	-26.5
WPKD	12	Z	500	11	0	39.5	42.0	-14.4
ZCBP6	00	Z	500	7	0	9.6	9.6	1.1
ZCBP6	12	Z	500	5	0	8.0	11.2	7.8
03953	00	Z	500	29	0	8.7	9.2	3.0
03953	12	Z	500	30	0	10.4	15.2	11.1
04018	00	Z	500	29	0	13.3	21.4	16.7
04018	12	Z	500	29	0	24.4	25.7	8.2
04220	00	Z	500	27	0	13.5	16.8	10.0
04220	12	Z	500	30	0	12.9	16.4	10.1
04270	00	Z	500	28	0	14.8	16.9	8.1
04270	12	Z	500	30	0	17.1	18.5	7.1
04339	00	Z	500	26	0	9.0	13.9	10.6
04339	12	Z	500	30	0	12.4	19.9	15.6
04360	00	Z	500	27	0	12.3	14.5	7.8
04360	12	Z	500	30	0	14.2	15.7	6.5
08001	00	Z	500	28	0	12.4	15.9	-9.9
08001	12	Z	500	29	0	14.2	14.3	-1.4
08508	00	Z	500	29	0	8.5	8.9	-2.7
08508	12	Z	500	30	0	11.5	13.0	6.0
08522	00	Z	500	28	0	7.5	7.6	1.3
08522	12	Z	500	30	0	7.7	12.4	9.7
08594	12	Z	500	23	0	8.7	8.9	-1.8
60020	00	Z	500	29	0	7.4	7.7	2.3
60020	12	Z	500	27	0	7.4	13.6	11.4
71600	00	Z	500	29	0	14.8	16.1	-6.4
71600	12	Z	500	30	0	15.0	15.1	1.1
72201	00	Z	500	29	0	5.2	5.6	2.0
72201	12	Z	500	30	0	5.0	7.0	4.9
72402	00	Z	500	28	0	6.0	7.5	4.5
72402	12	Z	500	30	0	8.2	11.0	7.3
74494	00	Z	500	27	0	12.5	12.7	-2.6
74494	12	Z	500	29	0	9.6	9.6	0.4
78016	00	Z	500	29	0	9.5	15.9	12.8
78016	12	Z	500	30	0	8.8	21.4	19.5

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in $m\ s^{-1}$
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	100	1	0	0	2.5	0.4	2.4
DBBH	00	V	100	20	0	0	7.1	1.4	-0.4
DBBH	12	V	100	19	0	0	7.8	0.6	0.9
DBLK	12	V	100	8	0	0	4.1	-0.5	1.2
ELML7	00	V	100	16	0	0	3.2	0.9	0.8
ELML7	12	V	100	19	0	0	3.3	0.3	-0.7
FNOR	00	V	100	11	0	0	4.3	-1.1	0.2
FNOR	12	V	100	11	0	0	3.4	0.2	1.9
FNOU	00	V	100	11	0	0	4.2	-0.4	-0.6
FNOU	12	V	100	12	0	0	4.4	0.3	-1.2
FNPH	00	V	100	7	0	0	3.0	-0.8	-2.1
FNPH	12	V	100	6	0	0	3.9	-1.4	2.0
FNRS	00	V	100	12	0	0	3.5	0.7	0.1
FNRS	12	V	100	10	0	0	3.3	-0.5	0.6
LDWR	00	V	100	29	0	0	2.5	0.0	-0.6
LDWR	12	V	100	28	0	0	2.4	-0.2	-0.3
OVYA2	00	V	100	2	0	0	5.0	-4.0	-1.8
OVYA2	12	V	100	2	0	0	2.1	-0.2	-0.6
OXYH2	00	V	100	5	0	0	1.9	-0.6	-0.5
OXYH2	12	V	100	6	0	0	3.0	0.1	-0.1
TOULOUS	00	V	100	17	0	0	3.4	0.5	-0.6
TOULOUS	12	V	100	18	0	0	3.9	1.6	0.1
V2XO	00	V	100	3	0	0	2.2	-0.3	1.4
V2XO	12	V	100	2	0	0	2.9	-1.0	2.0
WPKD	00	V	100	12	0	0	5.3	-2.2	0.7
WPKD	12	V	100	9	0	0	2.5	0.1	0.3
ZCBP6	00	V	100	4	0	0	3.2	-0.2	-1.4
ZCBP6	12	V	100	5	0	0	3.7	1.5	0.7
03953	00	V	100	28	0	0	2.6	0.8	0.8
03953	12	V	100	30	0	0	2.1	0.1	0.4
04018	00	V	100	28	0	0	3.4	0.9	0.2
04018	12	V	100	29	0	0	2.7	0.2	-0.4
04220	00	V	100	27	0	0	3.1	-0.5	0.8
04220	12	V	100	30	0	0	2.8	-0.1	0.0
04270	00	V	100	26	0	0	3.5	-0.6	0.6
04270	12	V	100	26	0	0	4.3	0.0	0.7
04339	00	V	100	22	0	4	6.5	0.8	0.1
04339	12	V	100	29	0	3	5.9	0.7	0.3
04360	00	V	100	27	0	0	2.8	0.5	1.3
04360	12	V	100	30	0	0	3.9	0.8	0.3
08001	00	V	100	27	0	0	3.8	0.4	0.4
08001	12	V	100	21	0	0	3.4	0.0	-0.6
08508	00	V	100	21	0	0	3.0	0.2	0.3
08508	12	V	100	20	0	0	3.4	0.2	0.2
08522	00	V	100	26	0	0	5.2	-0.9	0.3
08522	12	V	100	29	0	0	4.8	1.3	0.4
08594	12	V	100	20	0	100	5.0	-1.2	-0.3
60020	00	V	100	29	0	0	7.9	-2.3	0.7
60020	12	V	100	24	0	0	4.7	0.2	0.1
71600	00	V	100	29	0	0	3.4	-0.3	-0.2
71600	12	V	100	30	0	0	3.9	-0.1	1.0
72201	00	V	100	29	0	0	4.1	-1.1	-0.6
72201	12	V	100	29	0	0	3.4	0.6	0.1
72402	00	V	100	27	0	0	4.0	-0.8	0.4
72402	12	V	100	30	0	0	3.7	-0.3	0.1
74494	00	V	100	27	0	100	1.9	-0.1	0.3
74494	12	V	100	25	0	100	2.4	0.1	0.8
78016	00	V	100	29	0	0	4.9	0.8	0.1
78016	12	V	100	29	0	0	4.1	-0.5	0.3

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: September 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS: Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP1	12	V	500	1	0	0	4.4	-3.6	-2.5
DBBH	00	V	500	21	0	0	3.2	1.0	0.0
DBBH	12	V	500	21	0	0	4.3	-0.1	1.3
DBLK	12	V	500	13	0	0	4.0	-0.6	0.5
ELML7	00	V	500	18	0	0	4.7	0.9	1.3
ELML7	12	V	500	21	0	0	4.7	1.2	0.1
FNOR	00	V	500	11	0	0	2.5	0.7	-0.2
FNOR	12	V	500	13	0	0	3.8	0.0	-0.7
FNOU	00	V	500	12	0	0	4.1	-0.2	0.8
FNOU	12	V	500	12	0	0	2.8	-0.8	0.5
FNPH	00	V	500	9	0	0	6.0	0.7	0.4
FNPH	12	V	500	10	0	0	3.6	0.3	0.0
FNRS	00	V	500	12	0	0	4.6	-1.1	0.6
FNRS	12	V	500	10	0	0	3.5	-0.9	-0.9
LDWR	00	V	500	29	0	0	4.1	-0.6	-0.2
LDWR	12	V	500	28	0	0	3.7	0.0	-0.7
OVYA2	00	V	500	2	0	0	10.4	-7.2	2.4
OVYA2	12	V	500	2	0	0	2.9	-1.2	0.1
OXYH2	00	V	500	4	0	0	5.6	-1.2	-4.1
OXYH2	12	V	500	6	0	0	3.7	1.5	0.2
TOULOUS	00	V	500	17	0	0	3.2	1.3	0.2
TOULOUS	12	V	500	19	0	0	3.6	0.4	-0.8
V2XO	00	V	500	3	0	0	3.8	-2.7	-1.2
V2XO	12	V	500	3	0	0	3.4	-1.6	2.2
WPKD	00	V	500	12	0	0	6.0	1.0	0.2
WPKD	12	V	500	9	0	0	5.7	0.7	-2.8
ZCBP6	00	V	500	5	0	0	3.4	0.7	-0.8
ZCBP6	12	V	500	5	0	0	3.4	-0.2	1.1
03953	00	V	500	29	0	0	2.9	0.1	-0.2
03953	12	V	500	30	0	0	3.2	0.3	0.3
04018	00	V	500	29	0	0	4.4	0.0	-0.7
04018	12	V	500	29	0	0	5.1	-0.7	-0.9
04220	00	V	500	26	0	0	4.3	-0.4	0.2
04220	12	V	500	30	0	0	4.0	-0.8	-0.3
04270	00	V	500	28	0	0	4.3	-0.5	0.9
04270	12	V	500	30	0	3	5.2	0.2	-0.2
04339	00	V	500	23	0	0	7.1	-0.7	-1.7
04339	12	V	500	29	0	0	5.5	-0.1	0.2
04360	00	V	500	27	0	0	3.8	0.6	0.1
04360	12	V	500	30	0	3	7.4	-1.1	-0.6
08001	00	V	500	28	0	0	3.4	-0.1	-0.8
08001	12	V	500	23	0	0	3.0	0.0	-0.4
08508	00	V	500	22	0	0	4.4	0.1	1.2
08508	12	V	500	20	0	0	2.8	-0.3	0.0
08522	00	V	500	27	0	0	3.7	0.2	0.2
08522	12	V	500	30	0	0	3.8	-0.1	0.2
08594	12	V	500	24	0	100	4.3	-1.1	-2.4
60020	00	V	500	29	0	0	4.1	-1.0	-0.4
60020	12	V	500	26	0	0	3.5	-0.3	-0.1
71600	00	V	500	29	0	0	3.6	0.5	0.4
71600	12	V	500	30	0	0	3.5	0.8	0.0
72201	00	V	500	29	0	0	2.7	-0.7	0.5
72201	12	V	500	30	0	0	3.0	-0.2	0.0
72402	00	V	500	28	0	0	3.3	0.2	-1.3
72402	12	V	500	30	0	0	3.4	0.4	-0.2
74494	00	V	500	27	0	100	2.4	-0.1	-0.2
74494	12	V	500	28	0	100	4.2	0.2	0.6
78016	00	V	500	29	0	0	3.0	-0.4	0.4
78016	12	V	500	30	0	0	3.0	0.7	-0.3

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45